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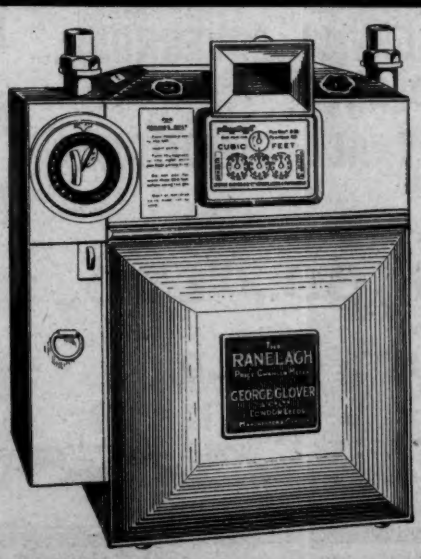

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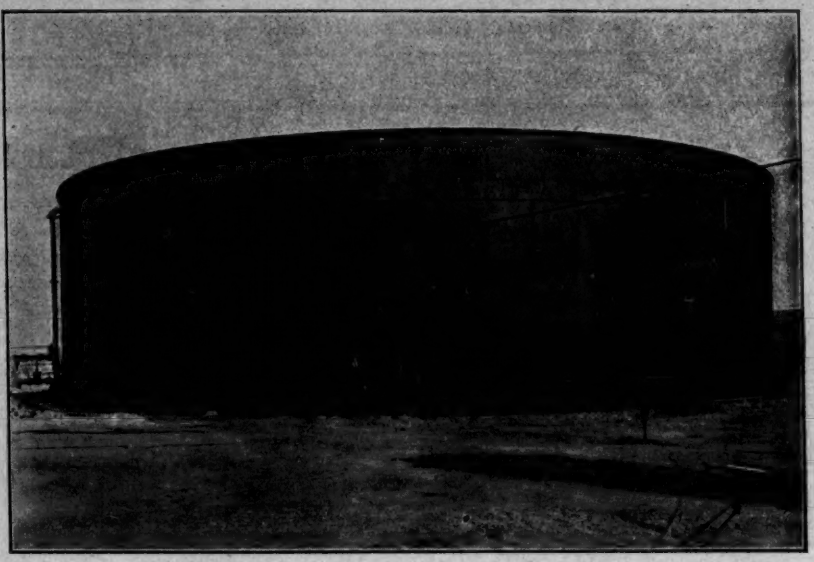

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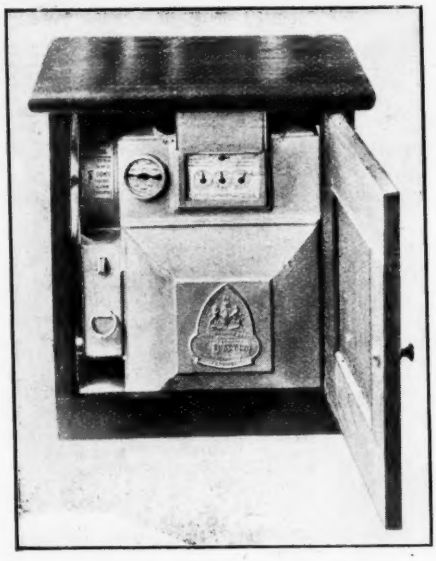

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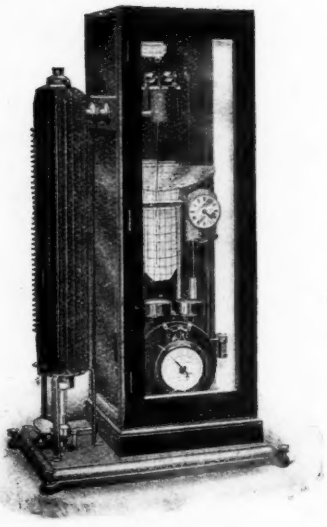

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EDITORIAL NOTES.

Back Dividends—The "Basic" Principle—Therm System and Municipalities.

"A QUIET and uneventful year" were words that were used by Dr. Carpenter, when moving the adoption of the annual report at the meeting of the Gas Companies' Protection Association last Thursday. That may be in one sense quite a correct description; but taking the report and the speech of the Chairman together, it will be seen that matters of considerable importance to gas undertakings generally, and gas companies in particular, have been under review, and action taken in regard to them. To some of these, apart from the deliberations of the Committee, the Chairman and the Secretary (Mr. F. E. Cooper) have devoted time, in interviewing the authorities, and discussing the matters with them.

There is the question of the payment of back dividends by sliding-scale companies. The ability to do this would only be an equitable proceeding. It always seems to us an unjust thing that companies which submit themselves to statutory control, although it gives them larger security, should be deprived of advantages which ordinary commercial undertakings possess, and which invest the latter with certain attractions for investors. Public utility concerns in these times require the aid of all possible inducements to obtain cheap capital; and it should be the policy of Parliament to confer them, and for the simple reason that public utility undertakings are rendering special public services. Moreover, the experiences of the past few years have brought into prominence the fact that, had the ability existed to pay-off the deficiency of dividends when favourable conditions allowed, the market values of gas stocks and shares would not have made the precipitate descent that they did during the war. To grant the power to pay deficiencies of statutory dividends in future years would therefore, in our opinion, be both an act of justice to stock and share holders, and a security, and thus an attraction, to investors. Thus it is not surprising to see that the Committee of the Association came to the conclusion that the power would be an advantage both to companies and to consumers. It would sometimes assist in maintaining prices per therm at a lower level when administrations were faced with what they had grounds to believe were only temporary difficulties in respect of prices of materials or of bad markets for bye-products. The Committee recommend sliding-scale companies, when applying for Acts or Special Orders, to include in them a provision enabling them to pay back dividends. This advice should be followed, even though (in view of what Mr. Campbell Cooper said at the meeting) the anticipations are that the clause would be ruled-out by the parliamentary authorities. It appears that in one Bill in the past session Mr. Campbell Cooper inserted such a clause; and it passed the Lord Chairman and his Counsel in the House of Lords. But it met with a different fate in the Commons. Speaker's Counsel held that exceptions could not be made in individual cases; and he suggested that representations should be made to the authorities on behalf of sliding-scale companies generally. Whether this will be done, was not stated at the meeting; but anyway it will do no harm to keep the question well to the fore by inserting a provision, as recommended, in Bills and Special Orders. There is bound to be a little trouble in making a start in this matter; but it will be conceded that eventual success would well repay that trouble.

Another matter which in our view is also highly important is the decision of the Board of Trade that they are not yet prepared to deal with the basic price and dividend system in Special Orders, despite the precedents created by Parliament in the cases of the South Metropolitan and certain other Companies. This is a question in which Dr. Carpenter is personally interested, as the originator of a principle which has points of advantage about it that appeal to us as eminently just and valuable. He has himself interviewed the Board of Trade on the subject, and other representations have been made to them. But the Board hold fast to the view that they cannot yet deal with the new principle, on the ground that in their opinion it has not yet been sufficiently threshed out by Parliament. This decision is unfortunate; and it is so regarded by Dr. Carpenter, as quite naturally he (with a large following of shareholders who look upon the basic price and dividend as giving them better protection than the sliding-scale) would like to see it applied as extensively as possible. At the same time he has sympathy with the attitude of the Board of Trade, who in such matters desire the explicit warrant of Parliament for what they do. The sooner the question is cleared up by inquiry or in some other way, the better; as, if there is value in the basic principle (we firmly believe there is) its adoption should not be denied the facile course offered by Special Orders. When the fuller investigation comes, whatever form it takes, Parliament will not be confronted with the necessity of adjudicating upon an innovation, as at the time the South Metropolitan Bill of 1920 was introduced, but they will have the benefit of the practical experience of working that has since accrued. That experience is good; and, with it before him, Dr. Carpenter is more persuaded than ever that the basic principle is the right one in regulating prices and the division of profits. However, the action of the Board in the matter has created the necessity for further investigation; and, as there is confidence as to the result, it is quite possible that the renewed examination of the question will be of advantage, in that it will result in a good spurt in adoption. But let it not be imagined that there is any necessity for deferring application through Bills promoted in Parliament. The question has been before the Parliamentary Authorities for some time; but this has not interrupted acceptance during the past session.

Among other subjects touched upon by Dr. Carpenter was that of hard glass. He is a strong supporter of home industries; and in this matter of glassware during the war and since, he has taken considerable interest. At first our manufacturers were not very successful in competing in quality and finish with the productions of Germany; but now Dr. Carpenter is able to report that the glass bought from British firms is as good in both respects as that manufactured in Germany. There was naturally great satisfaction on his part at the continued exemption (to the end of 1925) of public utility undertakings from the Corporation Profits Tax. It was also learned that the Association are prepared to give whole-hearted support to the maintenance of the therm system of charging. But there was an incidental remark by the Chairman as to the therm system not being popular with the municipalities. This is proved by their large abstention from making application under section 1 of the Gas Regulation Act, though we have not yet seen any strong case put forward as to why they should not come under it. There is an opportunity here of co-ordinating the conditions of gas supply in a manner never before attempted, and, in fact, never possible until an ingenious brain suggested the heat unit as a common basis for charge, with self-determination of calorific value per cubic foot, which taken together have a technical and commercial importance that perhaps is not apparent on the surface. Of

course, one can understand that municipalities, having been more or less a law unto themselves in the matter of gas manufacture and testing, will hesitate before placing themselves under a system which will strengthen obligation. But to the gas industry this should be an advantage, and not a disadvantage; and it would be the same to the undertakings individually through the constant service to, and the greater security obtained by, the public. To realize uniform conditions of supply is a distinct gain; and that uniformity will be highly effective in competition. Let it be remembered that, with the competing electricity supply, the only source of variability is the voltage; and therefore it is well worth while in gas supply to get standard conditions in each locality, and to ensure their constancy until circumstances arise which justify change. The Gas Regulation Act aims at this; and therefore we hope to see, in the general interests, a universal application of section 1.

The Education and Examination Scheme.

THE Board of Education (through Dr. Morley) and the Institution of Gas Engineers have intimated that there is now no objection to the publication of the scheme for the education and examination of those preparing for the technical work of the gas industry; and therefore we are in a position to reproduce it to-day. But it must still be regarded as more or less provisional, inasmuch as it has to be finally approved, and in respect of details is open to any useful modification. The scheme has been explained by Mr. Walter Hole at the meetings of the Eastern Counties Gas Managers' Association and the Wales and Monmouthshire Institution; and a report of his statement at the latter meeting will be found in this week's issue. After consideration by the District Associations, the scheme will be submitted for final approval at a special meeting of the Institution of Gas Engineers in February. The scheme, as a matter of fact, is the work of the Institution in collaboration with the Board of Education; and the Institution are anxious that all the preparations for its introduction into the technical educational work of the industry shall be made so that the winter season 1923-24 will see it in full operation. There ought to be no difficulty in that regard.

We do not propose to-day to enter upon any detailed examination of the proposals; but this reference is made with the sole object of helping to secure in the industry a widespread interest in the scheme. Such a scheme is much overdue. This is found in existing facts. Every educational institution in which the basic work of education in gas engineering and gas chemistry is undertaken, all follow more or less their own individual paths. What therefore the industry wants is, while maintaining a certain flexibility for special circumstances, to realize co-ordination and uniformity. This must be so where there are to be examinations, and the certificates are to have an equal standard of value. To secure greater uniformity is what the authors of the scheme have been aiming at; and, on first consideration, there is a large amount of approval in the gas profession respecting the result. This will be highly satisfactory to those who have had the matter in hand; for the devising of a scheme has been a matter of considerable anxiety and difficulty. It is recognized that opinions may exist that something better could have been devised; but when it is remembered that the authors of the scheme have been confronted with the difficulties, and have had to deal with them, then any individual who believes he could have done better will probably give the matter reconsideration. But this, as already indicated, does not mean that—"Here is the scheme; and you must accept it as it is." Until finally approved, it is open to modification that will improve it; and even afterwards, like any other piece of working machinery, any alterations can be made in it from time to time that experience says will be an advantage. In short, the scheme is not something that is inflexible and unalterable.

Gas Supply in a Mining Area.

THE members of the Wales and Monmouthshire District Institution of Gas Engineers and Managers did a very proper thing when they conferred the honour of the presidency upon Mr. Octavius Thomas, their Hon. Secretary, for he has worked hard and diligently for the organization, and has been one of its chief pillars. In his Presidential Address last Wednesday, he, with characteristic modesty, shared among the Past-Presidents and the members generally the honour for the work achieved. There is no doubt all have more or less contributed to the success; but the members know full well upon whom the bulk of the detail work has fallen.

There were two or three outstanding features at the meeting—the Presidential Address, of course, taking premier place. There was also an explanation by Mr. Walter Hole of the new educational and examination scheme for those aspiring to higher places in the technical work of the gas industry. And last, but by no means least, there was Mr. J. Mogford's paper on "Gas Manufacture in South Wales: "Its Past and Prospects." The paper was taken as read, and discussion deferred. We shall print it in an early issue. This leaves us with the Presidential Address; and let us say at once that, while it is a plain, unvarnished tale as to experiences in one of the uncomfortable places of the earth so far as gas supply is concerned, the President has in it quite unconsciously supplied a testimonial to his worth as a gas engineer and manager. We suppose one can get used to even the conditions that obtain in the Rhondda Valleys; but we can imagine that the head of the responsible official sometimes lies uneasily at night time, as, in the circumstances, one never knows exactly what is likely to happen in regard to the constancy of supply.

The gas service of this large scattered area passed from the possession of a company to the District Council in 1898; but the transfer meant a tremendously heavy liability on the undertaking—a liability which would cause some gas men to despair of ever making of the concern a prosperous and paying enterprise. It was in the year of transfer that Mr. Thomas took over the management; and he was then faced with a capital equal to £2317 per million cubic feet, with an amount required for interest and repayment of loan at the time equal to 28·23d. per 1000 c.ft. The consumption of gas then was only 61,384,000 c.ft. for the year; and the consumers merely numbered 1796. These alone are not pleasant conditions, with manufacturing plant of an antiquated type, and a distribution system leaking at every "pore" or break created by subsidences due to mining operations. But the President proceeded to scheme to set his house in order so far as he could. Retorts heated by direct firing and charged and drawn by hand were evicted; and regenerator furnaces took their place—resulting in higher gas makes, and giving more coke for sale. That was a good step in the economic reformation. At the same time, attention was devoted to the development of the business; and the prepayment system was applied. But here again the full advantage of the system could not be realized, in view of the greater part of the population in the area obtaining coal at a low price. But, on the other hand, there has been a large sale of gas-cookers, grillers, boiling-rings, &c. The issue of all this is that, in the year ending with March last, the sale of gas was 161,882,000 c.ft.—an increase during the years of Mr. Thomas's management of 163 p.ct., despite a 20 p.ct. recession during the war. This progress of the business has had an immense effect in reducing the capital per million cubic feet sold. The consumers, too, have increased from 1796 to 14,483, of whom some 9000 are on the prepayment system. At one time the President recommended the construction of new works to meet the increase and to derive further economies. But the District Council would not at the time face the expenditure. Later he submitted a scheme for increased storage accommodation. A new holder was built between the two works; and this, being filled during the daylight hours, has enabled the district to be supplied at night time without enlarging the trunk mains. At the Porth works, too, an additional ½ acre of land was secured; which permitted an installation of inclined retorts to be made (these being at the time much talked of); and these have worked satisfactorily since.

These details are emphasized here because they throw light on the difficulties that a gas engineer and manager has to encounter in the management of a works in such an area. But bad as were these conditions, the troubles in such a mining area are intensified enormously by subsidences, unexpectedly severe at times, and gradually going on more or less always; and so all the time affecting the stability and tightness of the distribution system. The result is heavy leakage. The President refers to one instance of subsidences varying from 8 ft. to 6 in. within short distances. In another case subsidences caused variations in level ranging from 3 ft. to 3 in. The strain upon the mains and services through these occurrences is of a very unusual order. Two examples: A 6-in. main was found broken, and the spigot end of one

pipe had passed the socket of the next by 4½ in. A 6-in. steel main was discovered broken. The socket was split; and the spigot end of the adjoining pipe had passed the socket by 5 in. These would be matters of extreme gravity for any gas undertaking; they are more so for one operating in a poor locality. The conditions necessitate systematic means of locating broken pipes and leaking joints. If this were not done, the leakage would represent a still greater proportion of the make. As it is, about one-fifth of the gas made is unaccounted-for; and no doubt Mr. Thomas's opinion is that he is doing pretty well in his circumstances if he can get below 20 p.ct. With all the methodical and unremitting survey of the distribution system, with the constant repairing that goes on, the unaccounted-for gas has striking dimensions. A table, showing the state of matters in this regard during the past decade, is extremely interesting. In 1913, it was 18·75 p.ct.; in 1922, 22·14 p.ct. The lowest figure was 14·39 p.ct. in 1915; the highest in 1917 and 1918, when the percentages were respectively 28·78 and 28·10—getting on for one-third of the make. During the war, Mr. Thomas was unable to have the same number of men on the work of discovery and remedy; and the result is seen in the high percentages. The table also shows that, in the year ending March, 1918, the number of broken mains was no less than 54. The "leaking joints" in such a distribution system is also seen to be appalling. The methods adopted to keep as perfect control as possible over the system is described in the address; and in this part of his functions, the President finds the greatest uncertainty of his professional life. It is almost as bad as chasing an *ignis fatuus*. But anyway it must be nearly heartbreaking to know that close upon a quarter of the gas that one takes such pains to make is unprofitably dissipated through subterranean instability. This loss is a weighty debit against the persistent drive to produce and sell gas at a low figure. Added to these defiant distribution troubles, the President recalls the anxiety he has had with a gasholder being thrown out of level until the water commenced to run out of the cups; and he also describes the remedial measures adopted.

It will be agreed that Mr. Thomas has been through the professional mill with a vengeance. Having read a chapter of experiences such as those that have been faced by the President in the Rhondda Valleys during the past twenty-four years, then those engineers and managers whose paths run in places where the reverse conditions exist have something for which to be profoundly thankful. When perplexed or harassed over matters that are more or less ephemeral commonplaces in the life of gas engineers and managers, it may not be amiss to let one's thoughts turn to the Rhondda Valleys and to other mining areas, where colleagues have constantly to meet conditions of greater difficulty and involving more pronounced and incessant hardships.

Finance and Unemployment.

THE members of the Society of British Gas Industries have to concern themselves largely in both finance and employment. The two things are correlated; and therefore there was no cause for regret that they should have had brought before them, at their meeting last Thursday, theories on the subject that are altogether antagonistic to the tenets cherished by the majority of them. The paper was by Mr. Arthur Kitson; and though he is very sincere in his beliefs, and perhaps a little dogmatic and largely pessimistic as to our immediate danger unless the powers that be adopt his advice, he too, upon reflection, may have gained some good from hearing the opposite opinions of practical men. Mr. Kitson has conferred benefit upon mankind by his inventions; and no doubt some of those who heard his paper will have come to the conclusion that he is a better inventor than a sound theorist in the affairs of the world of high finance. He criticized our banking system, the financial policy of the Government, and that of the Governments of most other countries; and it would appear that all the wealth of intellect that has been brought to bear upon the consideration of the huge financial problems of the world has been exercised in a wrong direction, and if only Governments and nations would accept the advice tendered in the paper all would be well, and we should have a new heaven upon earth. Mr. Kitson's voice was at the meeting as that of one crying in the wilderness; and it is pretty safe to say that he did not obtain a single convert.

There is nothing that men in industry want more than to see sound financial conditions established; but these are not to be obtained by beating the big drum of pessimism, and holding up a red flag of warning that as a nation we are on the brink of destruction, unless we quickly shape our ways according to the ideas set forth in the paper. We have only to continue a little longer on the present financial path, and the country will find itself in a "cataclysm." The country is also falling into "decay;" and we are "in danger of perishing in the midst of plenty." The statements do not appeal to hard-headed men of industry; they might to some Hyde Park audiences. There is, as a matter of fact, considerable optimism abroad to-day as to the gradual advance that is being made along the return road to prosperity; and there is a well-founded belief that there will soon be more progress made in the easing of conditions, which admittedly are very burdensome. Such optimism and such beliefs are the best aids to effort to cover ground to a desirable end. Our expert financiers, economists, and masters of industry are not of the same way of thinking as Mr. Kitson. They cannot all be wrong, and he alone right. So thinking, we are afraid that the deep-red signal that was used in the paper will be passed unheeded. Mr. Kitson speaks of discontent in the land, of vast armies of unemployed, of hunger stalking naked through the land, and so forth, which are the starting places of revolution. It is a lurid picture; but it is vastly overdone. Actually, unemployment is on the wane—slowly, but surely; and industries are improving their positions.

All the troubles appear, according to Mr. Kitson, to be due to the banking system and to the deflation of the currency. For illustration, he points to the wonderful things that were done at home during the war with an inflated currency, and to what is being done in Germany to-day. He did not travel farther. He did not penetrate Russia, and some of the near East countries. The paper, however, points to the wonderful things done in this country during the war—to the enlargement of factories, to the enormous increase of production, to the absence of unemployment, and to the abundance of purchasing power, which conditions existed for some eighteen months after the Armistice. All those things were not due to the then financial policy of the Government. They were attributable to an unprecedented abnormality, when millions of men were taken from industry to engage in fighting, and when the principal productions of the country were for destructive purposes, and were not purchasable by the people even with the large distribution of money that was proceeding in the form of wages. Not all industries flourished during the war, and during the period of an inflated currency. Those that did so were mostly engaged in the production of munitions of war; and those that flourished most after the Armistice were the ones that were kept busy remedying in other industries the wear and tear that had been so largely neglected. The war, Mr. Kitson reminds, left us with a national debt of £8,000,000,000. That is a figure to keep in mind when considering his submission that, if the Government had employed the same factors after peace as during the war, they could have made a sort of paradise of this country. What would it have cost to do that? Perhaps not the cost of the war; but there would have been a continued inflation of the National Debt, which one does not wish to see. The submission and the hypotheses on which the argument is based will not bear any close scrutiny. In short, to follow Mr. Kitson would be to pass through a wood into a jungle, from which it would be more difficult to find escape.

The argument of Mr. Kitson is set in favour of the maintenance of an inflated currency, so that more money can be distributed. But where is the benefit of giving people more money as wages, which he assumes will have a greater purchasing power, if this larger distribution is only possible by maintaining an inflated cost of production, which adds so largely to the selling price? We wholly fail to see how this would produce greater contentment. But in this regard, there seems to be an ideal which is an obsession with Mr. Kitson. He says that "a thoroughly "scientific industrial and financial system would be one in "which the amount of money distributed was sufficient to "enable the public to buy all the goods the country is "capable of producing. This would require not merely a "sufficient supply of currency, but a regulation and limita-"tion of prices." Our experience during the war of an inflated currency, which partly accounted for prodigal spending, and of the regulation and limitation of prices, was not of a kind that will make of many people disciples of

such theorists as the author of the paper. In his argument there is something that is illogical, and in his illustrations in support much that is incompatible with the argument. Germany he tells us has no unemployed, and the factories are running full time; yet there they have an inflated currency—and very much so. But the exports of Germany show that the people there fall very far short of the ideal of Mr. Kitson—of having sufficient purchasing power to absorb their own products, and what is more they have no inclination to absorb them all, for the simple reason that they do not want them. What they desire is that a large part of their goods shall find customers in other countries, in order to keep German factories at work and people employed. While people may be employed in Germany, the reports of discontent and hardships cannot be altogether discredited when they come to us from our compatriots resident there. The same in this country as in Germany. The classes of goods turned out here are not all required by the people, whatever their purchasing power may be, and the custom of countries abroad is necessary to enable us to give employment, and so add to the purchasing power of our people. The trouble is that the whole world is in a state of flux at the present time; and until there is general stability, there will be considerable difficulty, which will not be assuaged by such artificial means as an inflated currency. However, inflation of currency is the base of insecurity on which Mr. Kitson believes that every industrial city and town could have been rebuilt, our slums converted into garden cities, want abolished, and this England of ours made into a demi-paradise. We are glad he did not get beyond the "demi." Even so, we do not believe in his panacea for present troubles, nor do the men whom he was addressing last Thursday.

Appeals to the Chief Gas Examiner.

In our "Miscellaneous News" are published the regulations applying to appeals to the Chief Gas Examiner under the Gas Regulation Act.

The Therm "Mystery" Deepens.

The lower gas bills for the September quarter are still a matter of mystery to certain newspapers. The "Daily Mail" has been puzzling its brains over it; and in the result it has come to the wonderful conclusion that the reduction must be due to the consumers having read their meters carefully, after their experience in the June quarter. Albeit our contemporary still holds that the decreases are as mysterious as the higher figures for the preceding quarter. The bills, we are told, confirm the consumers' own readings of their meters. It is also admitted as true that the price per therm has decreased; but this, it is said is not sufficient to account for the remarkable drop in the bills Our contemporary seems to be absolutely incapable of anything but the most superficial reasoning over this question. We are glad to learn that the consumers have taken to reading their meters, though a little sceptical on the point, and very much disposed to question the authority of the "Daily Mail" for making the statement. Assuming, however, that they are reading their meters now, also that bills are lower, and that the reduction of the price is not sufficient to account for the lowering of the bills, then this points to the reading resulting in more economical use, where there was uneconomy before. Certain it is that the gas companies have no means of controlling the operation of the mechanism of the meters from any central point, nor of regulating the number of heat units that a consumer uses. Moreover, they cannot make the therm an active agent in either regard; and they cannot compel the therm to do their bidding. All this newspaper surmise is very silly; and, every time, the material factors are ignored which constitute the true explanation of higher accounts here and there.

Industrial Use.

The "Evening Standard" has also been missing the mark. It refers to the recent comparative statement issued by the South Metropolitan Gas Company, which, as we pointed out last week, showed quite small average variations in the amounts of gas bills as between corresponding quarters. The "Evening Standard" says that while the accounts of public bodies, business firms, and private consumers exhibit increases, the industrial users have actually had smaller bills. They ask the question, "Is gas becoming unpopular for industrial purposes, or does this not prove that having a heating rather than a lighting unit is to the advantage of the industrial users at the expense of the private consumers?" The simple answer to this piece of nonsense is that industrial depression, which has apparently escaped the notice of the "Evening Standard," is at the bottom of the reduced consumption of gas for manufacturing purposes. Seeing that the domestic consumers use more gas for heating than lighting, it is difficult to see the relevancy of the latter part of the question; moreover incandescent gas lighting also requires heat. Perhaps that is a piece of news for the "Evening Standard."

Inaccessible Meters.

In the paragraph on the deepening of the therm mystery, it will be observed that we have the assurance of the "Daily Mail" that consumers have taken to reading their meters. But according to the "Pall Mall Gazette," this cannot be. The gas companies, this paper says, urge consumers to read their meters regularly; but they make it difficult, if not impossible, for them to do this by tucking away the meters in most inconvenient and inaccessible places. There is some amount of truth in this; but the statement has not universal application.

A Committee on Gas Lighting.

The report of the Chairman of the Society of British Gas Industries (Mr. Albert Cliff) refers to the Joint Committee that has been set up by the British Commercial Gas Association and the Society to consider certain matters affecting gas lighting. This is an excellent step, as there is much work that requires to be done for the protection of this important branch of the gas business. One of the points for consideration is the standardization of the essential parts of the burner; another question is the elimination of shoddy burners, mantles, and fittings from the market; and a third, the maintenance and development of gas lighting. The last two matters are highly important; and they have a bearing one upon the other. Shoddy burners, mantles, and fittings, which are purchasable by consumers in most towns, are very much to the advantage of competing agents. Gas lighting, through indifferent burners, mantles, and fittings, gets a bad name; and where this happens, a competitor finds an easier entrance.

Gas Coke in 1921.

In the annual report of the Chief Inspector of Mines, it is stated that, excluding the amount used at gas-works, the quantity of gas coke "sold" during 1921 in the United Kingdom was 6,798,492 tons, as against 8,307,141 tons in 1920. The value at the works is returned at £14,369,952 and £18,847,357 in the two years respectively. It will be noted that the figures refer to the quantity sold "in the United Kingdom," and nothing is said as to exports. The diminution was no doubt greatly due to the coal stoppage, and the shrinkage in the production of coal gas, together with the additional make of water gas, and the depression in industry. But we had not anticipated a difference of 1½ million tons.

Metallurgical Coke.

The effect upon the coke-oven industry of the coal stoppage and industrial depression is shown in the same report by notable figures. In 1921, only 6,885,940 tons of coal were carbonized, compared with 18,854,743 tons in 1920. The production of coke was only 4,575,618 tons, as against with 12,611,435 tons in 1920. The beehive ovens in use in 1921 numbered 4044; in 1920, 5384. The number of bye-product ovens was 8146, as compared with 8914; so that in these there was not such a remarkable difference. There were 836 of "other kinds" of ovens at work in 1921, and 1102 in 1920. The total number of ovens of all kinds in use was 13,026 in 1921, compared with 15,400 in 1920. These figures show a decrease of 15·4 p.ct. in the number of ovens in operation; but many of them were only at work part of the year, which accounts for the coal carbonized being reduced by as much as 63·48 p.ct., and the coke produced by 63·7 p.ct.

Sulphate of Ammonia Exports.

The quantity of sulphate of ammonia exported in September was 14,873 tons, compared with 12,262 tons in the same month of

1921. In the past nine months, the quantity shipped was 103,261 tons, compared with 97,149 tons in the corresponding month of 1921.

Coal Trade Items.

There is a feeling that, generally speaking, the outlook in the coal trade is improving. The growth of the export coal business is good, and more coke-ovens and blast-furnaces have been put into operation, which is an excellent index to returning demand in the iron and steel industries. The season for domestic gas and coal consumption is here; and the weather has made the domestic fire an absolute necessity. On the other hand, a return for the June quarter indicates that there was in the period a net deficit of £34,685 on the working of the industry. The same document shows that the total number of man-shifts worked during the quarter was 59,831,062, and the number lost which could have been worked was 4,677,252. This is bad in view of the growing demand for coal. An interesting feature of the recent trouble in South Wales was that the stoppage ordered by the South Wales Miners' Federation ended in a perfect fiasco; some 60 p.ct. of the men refusing to comply.

Gas Coal Position.

The recent cold weather has had the effect of causing still greater pressure for supplies of coal to gas undertakings. This is the tenor of the reports from the various coal markets. In Durham and Northumberland, the requirements for gas coal are quite on a level with the supply, so that in those areas there does not appear any margin worth speaking about for open market business. The quantity of gas coal leaving our shores for buyers abroad is on a considerable scale—especially so in the case of Germany. But so far as Durham is concerned, fresh inquiry from Continental buyers appears to have slowed-down somewhat; and it is thought that this is due to the rather higher prices that have ruled the last two or three weeks. However, Yorkshire appears to be benefiting from this, as the collieries there have had during the last week or so an enlarged inquiry for gas coal for export business. In that area, too, the demands for home supplies of gas coal continue the upward trend; and the same may be said of the districts of Lancashire, Cheshire, Nottinghamshire, and Derbyshire. In the Lancashire area, although there are more contracts for gas coal running now than there have been for some few years, there is a good deal of open-market buying going on. This is probably due to the larger needs for current purposes, as well as for reserves.

PENDING RETIREMENT OF PROF. ARTHUR SMITHELLS FROM UNIVERSITY WORK.

There has been intimation in the papers of the intention of Prof. ARTHUR SMITHELLS, F.R.S., to retire, at the end of the present session, from the position of Professor of Chemistry at Leeds University, in and to which he has rendered such distinguished service. This retirement is taking place two years earlier than would have been the case in the ordinary course of events. There will be great regret at the University over this separation, as it means parting with the active and immediate association of one beloved by all, and who has been an inspiring force in the scholastic work there. But in view of the motive for early retirement, there will be less regret elsewhere. Through our personal friendly relations with Prof. Smithells, we know what that motive is. It has been weighing with him for some time. There are several things that he is anxious to do that it is very difficult for him to undertake amid the present crowded and busy conditions of University life. We know, for example, that there is much about which he wishes to write; and he is naturally deeply interested in the developments that are taking place in chemistry, and is desirous of studying their bearing on some of his old research work on the subject of flames and combustion. Prof. Smithells has been a prominent figure in the scientific work of the gas industry—more especially since the establishment of the Livesey Chair at Leeds University. But prior to that, among all students of the science of gas manufacture and use, his work had made his name a "household one" in the gas industry. From the industry, the best wishes will go with Prof. Smithells in his retirement from University life, though not from work, and that this work will be rewarded with abundant success will be the hope of all professionally concerned in the industry.

Midland Junior Gas Association.—There will be a visit of members next Saturday afternoon to the works at Stechford of the Parkinson Stove Company, Ltd. They will meet outside the works at 3 o'clock.

PERSONAL.

The Nenagh (co. Tipperary) Gas and Electricity Supply Company have appointed Mr. MICHAEL FLANNERY Manager.

Mr. H. H. TUCKER, the Deputy-Mayor of Walsall, and Chairman of the Gas Committee, is not seeking re-election to the Town Council.

At the forthcoming general election, Mr. FRANK GRAY, the Secretary of the Oxford Gas Light and Coke Company, will contest the seat for Oxford City in the interests of the Liberals.

Mr. J. DAVIES, the Manager of the Oswaldtwistle Gas-Works, who recently tendered his resignation to the Council under circumstances already reported in the "JOURNAL," has now withdrawn his notice, at the pressing request of the Gas Committee. It is probable that the question of salary will come before the next meeting of the Council, and will then be finally disposed of.

Mr. GEORGE JULIUS WEBBER, eldest son of Mr. Joseph Webber, of the Provincial Incandescent Fittings Company, Ltd., took first-class honours in the LL.B. Final Examination of the London University, and was awarded the University Scholarship. As already announced, Mr. Webber was called to the Bar in January this year, having headed the list in the Bar Final Examination, with the three years' studentship of 100 guineas, and 50 guineas extra honorarium for good work performed.

The Birkenhead Corporation Gas Committee have considered the question of the appointment of a Gas Engineer. The Chairman reported the result of the further deliberations of the Sub-Committee regarding the filling of the vacant position, and the question of the appointment of a Gas Engineer was deferred for a period of six months from Oct. 1. In the meantime, Mr. H. E. STONE, Deputy Gas Engineer, was authorized to act as Engineer for the gas undertaking at a salary of £700 as from June 1, 1922; the engagement to be determinable by three months' notice on either side at any time.

Mr. C. S. GARLAND, Managing-Director of Lighting Trades, Ltd., is contesting the South Islington constituency as the official Conservative candidate at the General Election. He has to his credit, among other diplomas and distinctions, the Associateship of the Royal College of Science, the degree of Bachelor of Science (with honours) at the London University; he is a Fellow of the Institute of Chemistry, Vice-President of the Society of Chemical Industry, a member of the Institute of Chemical Engineers, and an executive member of the National Union of Manufacturers. Mr. Garland is a prominent member of the Joint Industrial Council of the Gas-Mantle Industry, and has done a great deal of welfare work for the workers in this industry.

Mr. J. H. PATERSON, Technical Assistant at the Gas-Works, Deal, and son of Mr. J. J. Paterson, the former Manager, has been appointed Assistant Manager at the Hessle Gas-Works. The occasion of his departure was marked by the employees of the Deal Gas-Works as an appropriate opportunity to convey to Mr. Paterson their appreciation of the cordial relations and good comradeship which had existed between them during the three years he had laboured among them. These sentiments, together with a handsome week-end travelling bag, were conveyed to Mr. Paterson by Mr. F. West, distribution foreman, at a representative gathering of the workmen. Mr. Paterson suitably replied, and thanked the men for their kind thoughts and good wishes for his future welfare.

OBITUARY.

Mrs. EMMA SPENCER, widow of Mr. Walter Spencer, of Elland, Yorks., who had many friends in the gas industry, passed away on Friday, Oct. 20, at the age of 68. The funeral took place at Elland Cemetery on the 24th. She leaves four sons and one daughter.

Royal Society of Arts Programme.—The sessional arrangements of the Royal Society of Arts include a paper, on Nov. 22, by Bailie William Smith, of Glasgow, on "The Economy of Smoke Abatement," and others to be read after Christmas by Dr. W. A. Bone, on "Recent Developments in Surface Combustion," and Mr. W. J. Rees, on "Progress in the Manufacture of Refractories." Dr. Bone will also deliver a series of three Cantor Lectures, on Nov. 27, Dec. 4, and Dec. 11; his subject being "Brown Coal and Lignites."

Institution of Chemical Engineers.—At a meeting of the Provisional Committee of the Institution on Oct. 18, the Hon. Treasurer submitted a statement of account to date, showing a balance which, in the opinion of the Committee, was not sufficient to meet current expenses. Mr. F. A. Greene thereupon handed over his cheque for £50, being the balance of the amount of his donation (£100) towards the initial expenses of the Institution. A hearty vote of thanks was passed to Mr. Greene. After discussion with reference to subscriptions, letters were read from the Solicitors relating to amendments of the constitution suggested by the Board of Trade. These amendments were accepted, and the memorandum, articles of association, and bye-laws, as drafted and amended, were approved.

ELECTRICITY SUPPLY MEMORANDA.

THERE comes a day of reckoning for most prodigals. It has come to the Hereford Corporation Electricity Committee in a most unpleasant manner not only for them, but for the ratepayers.

The Day of Reckoning.

Those simple ones who talk so much about meat wasting more when heat is supplied by one agent than by another (though the temperature and all other conditions are uniform), who say a gas-fire does not aid ventilation, and that the heat from a gas-burner does not make an upward movement of the atmosphere, and thus be also utilized for ventilation purposes, and who think that where there is no provision for ventilation, and electric lights and radiators are used, the air does not become stagnant—these are the same people who thought that good business was to be done by running expensive cables to the by-ways and hedges of rural life. So they strongly supported Hereford when it embarked on the prodigal scheme of spending freely to secure a modicum of unprofitable custom. The day of reckoning has already come. Hereford knows now that it has been irrevocably placed in possession of a white elephant, which will simply continue to eat off its head through its requirements in interest and sinking fund. The Special Committee of the Corporation appointed to consider the matter have continued to be very busy. But from what we gather, the matter is rather beyond their depth; and some people think that there should be an inquiry by an independent body, such as the Electricity Commissioners. However, some ugly facts have appeared, which have made the ratepayers "sit up." There was, for example, a sum of £13,482 spent up to June, 1920, of which only £7312 was for Breinton, Sugwas, and Clehonger—places we did not know were on the map—and it is believed that of this sum no less than £4888 was spent to connect-up twenty consumers! That money, as said, was spent up to June, 1920. But now it transpires that the Electricity Committee did not know the cost until October, 1921; and they acknowledge that it was considerably above the estimate. What are the ratepayers to think of a Committee to whom administrative powers are confided, and who do not keep better supervision over expenditure than is divulged by this admission? The Committee agree that a mistake was made in proceeding with work without obtaining definite agreements from those they expected would be consumers. They appear to have relied too much upon the vaunted virtues of electricity, and not sufficiently upon making their position secure. When consumers were connected-up, it now transpires, they were unwilling to sign the standard agreement. Another admission by the Committee. A scheme that was to cost £19,857 for Weobley, Leominster, and Kington actually ran away with £25,650 up to Dec. 31, 1920; but it was not until September, 1921, that the Committee were aware of the excess expenditure!

Beyond Their Depth.

The Chairman of the Special Committee confesses that the Inquiry Committee are not, in his opinion, dealing sufficiently definitely and carefully with the most important part of the business. They are endeavouring to find out how much money has been spent, and where. This will not diminish the liability of the city by a fraction of a penny. His view is that the revenue-earning capacity is of greater importance. No doubt; but revenue capacity in such fixed circumstances must be diminished the greater the capital outlay. Certain it is that the revenue per unit of capital expenditure cannot, in these outlying areas with their little batches of cottages and occasional farmhouses, without a prohibitive cost for current be so productive as the capital expenditure in the more densely populated parts of the city. Therefore the consumers as a whole must suffer in any circumstances—in the present circumstances particularly so. It has been a costly venture; and on the facts it seems impossible to exonerate the Electricity Committee from all blame. There is no doubt, too, that the Special Committee have been entrusted with an investigating task altogether beyond their capacity. It would save time, and the truth would be ascertained, by having an investigation by a Committee specially—technically and financially—qualified for it. Otherwise there is small chance of thoroughly probing this interesting, though discreditable, piece of maladministration.

An "S.O.S." Signal.

The electricity supply industry generally, and those engaged in it in Reading particularly, appears to be in a bad way, or so it would seem from a full-page advertisement that has been inserted in the local Press. It is a kind of round-robin advertisement appealing for help. One would not begrudge this appeal, were it not that so many of the statements are untrue, misleading, and absurd. No doubt the success of the local Gas Company is envied—the steady growth in the consumption of gas due to its greatly increased use for heating, cooking, &c. Is it, for instance, ignorance or wilful misrepresentation that prompts the statement: "Electric light is the only light which can be switched on or off instantly from any convenient point"? A visit to the local Gas Company's showrooms should convince even the most rabid partizan of electric lighting that gas also "can be switched on or off instantly from any convenient point." There are numerous examples of the distance gas-lighter in Reading; and thousands of buildings in London and elsewhere are fitted with it. The effect of electric lighting on the eyesight is studiously avoided by electricians; and one is tempted to supply the omission by quoting the definitely expressed opinion of an eye specialist. It is this:

> **In electric light the violet and ultra-violet rays prevail, while in the gas-flame the red and yellow rays are most prevalent. The violet and ultra-violet rays have a very bad effect upon the optic nerves, and cause weakened eyesight in many cases, while the yellow and red rays, instead of doing harm, have a stimulating effect.**

Dr. J. A. Shears, M.D., the Sanitary Expert to the Health Department of New York, recently pointed to "the minimum of fatigue experienced by the eye when working under the influence of the incandescent gas light;" and he considered this feature one of great importance. It is a well-known fact, too, that incandescent gas lighting, while affording excellent illumination, warms the air sufficiently to establish an upward movement of the atmosphere and with it the removal of the products of human respiration with their noxious organic contents. Such matters, however, are studiously bye-passed by the electricians. To them they are not palatable. All they can do is to attempt to ridicule them but ridicule cannot destroy facts.

Lapse of Memory?

Another extract from the Reading electrical advertisement is this:

> **The bane of the coal-fire—the smoke, the dirt, the cleaning up and laying of fires, and the constant carrying of fuel—has been the burden of the housewife's complaint from time immemorial. Yet she has put up with all this labour because a fire she must have; and there was no better means of obtaining one.**

There is ignorance here, or a pitiful loss of memory. Does the writer of the above imagine for one moment that there is any intelligent housewife in Reading who has not heard of the inestimable boon conferred upon those who use gas-fires? Why is it that there are thousands of gas-fires in use in Reading? Why is it, too, that eminent London physicians and surgeons have written to the Gas Light and Coke Company, expressing their opinion as to the healthiness and advantages of gas-fires? Is it not because all the advantages *claimed* for the electric radiator can be *actually* obtained by the use of a gas-fire, with other great additional advantages which will appeal to the economical housewife? The cost of the gas-fire, for instance, will not make nearly so great a drain on the household purse as the electric radiator.

Gas *v.* Electric Cookers.

Another quotation from the Reading electrical appeal reads:

> **The fumes arising from the burning of any fuel are more or less poisonous. There are no fumes in an electric-cooker, and food cooked electrically has a clean taste. The absence of any fumes and deposits, as from burning coal or gas, accounts for this.**

For the last twenty years, we have read *ad nauseam* such statements as this put forward by electricians. They are much worn through age and constant use; and people now smile when they read them. If they were true, the gas industry would be on its last legs, and the population of Reading would have died out. But what has happened? The population has doubled, notwithstanding the fact that the vast majority use gas for lighting, heating, and cooking. The number of cooking-stoves on hire in Reading alone is no less than 17,000; and this does not include the consumers who possess their own cooking-stoves, and do not hire them from the Gas Company. Such statements as those made in the advertisement will not impress the public. They are already aware that electricity for cooking is dear to instal, to use, and to maintain, and unsatisfactory in results. The Reading Gas Company had a recent glaring example of the costliness of electricity for cooking. Electric-cookers were installed in a building; but the authorities were astounded at the cost. Gas-cookers were substituted, with the result that, *in the first quarter of the year*, the saving, as compared with the cost of electric cooking, paid the capital cost of the gas apparatus. The actual figures showed that cooking by electricity was nearly four times more costly than with gas. The above figures speak for themselves, and are convincing. Electricians should face facts. Gas is still supreme in most of the fields in which it meets with electric competition; but there is plenty of room for both. The electrical people should realize that gas is a worthy competitor, instead of making more or less acrimonious and veiled attacks upon it.

Wiring by Hire Purchase.

It is legitimate for the electricity supply industry to take advantage of every proper means to increase their business; but just as they keep their eyes on the doings of the gas industry in this particular, so the gas industry must keep its eyes on their proceedings. We see that at Aylesbury the Town Council have approved of a scheme for wiring houses on the hire system. The scheme has been drawn up by Mr. W. A. Turnbull, the Electrical Engineer. He points out that, in considering the commercial aspect, the capital outlay should be as low as practicable, compared with the revenue received; so that it may be expedient only to wire the rooms more generally used, and not the bedrooms. We do not quite know by this what Mr. Turnbull is driving at, but it looks as though he has his eye on the cream of the lighting, leaving the more intermittent light-

ing to some other system. But this is not according to electrical aspirations of all-electric houses. Here expediency takes the ascendant over electrical professions as to the supreme fitness of electricity for all purposes and in all situations. It is stated that the scheme is being considered more particularly from the small-house point of view, but even here six lights could be installed; and if business could be done by the supply of three lights, the hire rental would be about half, and the consumption would not be much reduced. In cases where additional lights were required, they could be installed at the tenant's expense at a cost of about £1 a room. The cost of wiring three points, excluding the service and meter and lamp and shade, would be about £3 10s. It will be noticed there are several necessary things "excluded" from the price. Allowing 3d. per week for capital and running expenses, this works-out to 18½ p.ct. on the capital expenditure. The ordinary tariff for electricity is to apply; and the hiring rate for three points is to be 3s. 3d. per quarter. In approving of the scheme, the Council decided that all wiring should be left in the hands of the local contractors, provided their charges do not exceed £1 per point.

Consumers and Meters.

The great disproportion of meters to consumers, where differential rates for current are in operation, is shown by figures from Blackpool. There the number of consumers is 4932, while 6500 electric-meters have been installed. The difference between those two figures means considerable capital expenditure. It is one of the penalties of having to charge more per unit for lighting than for energy for power and heating, seeing that for the latter purposes electricity would otherwise stand little chance in competition with other agents. This accounts for those freakish systems of charging for electricity, with rateable value or floor area as the basis of a primary charge, and with a low price per unit for the current used.

The Assistance of Gas Undertakings.

In some places the aid of gas undertakings in the work of electrification is warmly welcomed; but there is, as seen in the "Memoranda" last week, at least one prejudiced electrician who does not want this assistance, and so talks in an incoherent way about "degassing" the electricity supply industry. Whether he likes it or not, there will be gas undertakings that will incorporate electricity supply in their business, either by way of general supply, or by affording facilities for the adoption of private generating plants by manufacturers. Those who desire to be electricity consumers will approve of this. We see that the Jersey Gas Light Company, Ltd., have lodged a Bill for power to supply electricity for private and public purposes. At Retford the Traders' Association are supporting the proposal of the Corporation to establish a generating station at the gas-works. These are not the only places; there are several others where the combination movement is advancing. The electrical writer who would "degas" the electricity industry cannot stay progress.

TECHNICAL EDUCATION AND EXAMINATIONS FOR THOSE ENGAGED IN THE TECHNICAL WORK OF THE INDUSTRY.

The Board of Education (through Dr. Morley) and the Institution of Gas Engineers have now given consent to the publication of the scheme for the future education and examination of those engaged in the technical work of the gas industry. It is as follows:

SECTION I.—Scheme for the Awarding of Grouped Course Certificates in Gas Engineering and Gas Supply by the Institution of Gas Engineers, with the endorsement of the Board of Education.

1. The Institution of Gas Engineers are prepared to grant, and the Board of Education are prepared to endorse, certificates to students who have completed satisfactorily an approved course of study in Gas Engineering and Gas Supply, together with cognate subjects.

2. For the present it is intended to award certificates only for success in part-time, day, or evening courses.

3. The certificates will be of two grades—ordinary and higher.

ORDINARY GRADE.

4. The course for the ordinary certificate shall

(*a*) extend over three years;
(*b*) require attendance for not less than 150 hours per annum;
(*c*) comprise the general subjects (such as mathematics, physics, chemistry, or engineering) upon which the successful study of Gas Engineering or Gas Supply depends;
(*d*) be suitable for students who have received full-time education up to 15 or 16 years of age, or who have passed with credit through a junior or preliminary technical course, such as is provided in evening continuation schools, or who have passed a satisfactory entrance examination. The admission of students over 18 years of age, who appear to be capable of following the instruction, will be left to the discretion of principals of approved technical schools.

5. The certificate will be called an "Ordinary Certificate in Gas Engineering and/or Gas Supply," and the subjects comprised in the course will be indicated upon it.

HIGHER GRADE.

6. The course for the higher certificate shall

(*a*) extend over at least two years;
(*b*) require attendance for not less than 150 hours per annum;
(*c*) comprise both Gas Engineering or Gas Supply and cognate subjects of Chemistry or Engineering; but in this respect more latitude in the choice of subjects will be allowed than in respect of the course for the ordinary certificate.

Students who desire to enter the advanced course shall possess the ordinary certficate in Gas Engineering and/or Gas Supply, or some equivalent qualification, such as the National Certificate (ordinary) of the Institute of Chemistry and the Board of Education or the National Certificate (Ordinary) of the Institution of Mechanical Engineers and the Board of Education.

7. This certificate will be called a "Higher Certificate in Gas Engineering and/or Gas Supply," and the subjects comprised in the course will be indicated upon it.

APPROVAL OF SCHEMES.

8. Before approving a scheme, the Institution of Gas Engineers and the Board of Education will require to be satisfied as to the equipment of the school, the qualifications of the staff, the curriculum and the syllabuses of instruction in the several subjects, and the steps to be taken to secure that students are not admitted to the courses unless they are able to profit by them. Recognition of the school for grant under the Board of Education will not necessarily imply that the conditions in regard to equipment, staffing, &c., are such as the Institution and the Board can accept for the purpose of the endorsement of certificates.

9. For the present the Institution may decide to issue, and the Board to endorse, certificates in respect of courses taken by students who have not fulfilled the prescribed conditions, provided that such prescribed conditions are fulfilled in the last year of the course.

10. A student shall, as a rule, take the whole of a course in one school; but, with the previous approval of the Institution and the Board,

(*a*) different years, or different parts of a course, may be assigned to different schools, provided the curricula are suitably co-ordinated and the other conditions are fulfilled;
(*b*) a student who migrates from one area to another, or who has received satisfactory instruction in certain subjects at a secondary school or elsewhere, may be excused attendance in those subjects in which he is already proficient, except in the final year of a course. In exceptional cases attendance in subjects in which the student is already proficient may be excused, or he may be required to take other alternative subjects, at the discretion of the Institution and the Board.

11. In subjects other than Gas Engineering and Gas Supply the results of the ordinary school examinations will be accepted, provided that the student obtains not less than 40 p.ct. of the marks

(*a*) at the annual examination in each subject;
(*b*) for (i.) homework,
(ii.) such drawing and laboratory work as is included in the course.

PAPERS IN GAS ENGINEERING AND GAS SUPPLY.

12. In Gas Engineering and Gas Supply the papers will be set and the scripts will be marked, in the course for the ordinary certificate, by the teachers; but the questions and the marking will be subject to revision by an assessor or assessors to be appointed by the Institution.

In the course for the Higher Certificate the papers in Gas Engineering and Gas Supply will be set and the scripts marked by examiners appointed by the Institution.

The standard for a pass in both courses will be 40 p.ct. No certificate will be awarded to a candidate who fails to secure 50 p.ct. of the total marks in the final year of a course, including homework, drawing, and laboratory work. A candidate who obtains 85 p.ct. in any subject will pass with distinction; and this success will be recorded on the certificate.

13. Applications for the approval of schemes shall be submitted to the Board of Education before Oct. 31 in any year, and draft examination papers in Gas Engineering and Gas Supply for the ordinary certificate shall be forwarded to the Institution of Gas Engineers not later than two months before the Examination.

14. For the purpose of carrying out this and subsequent sections of the scheme, the following appointments will be made:

ADVISORY COMMITTEE.

(*a*) An advisory Committee of not more than 12 members, nominated by the Institution of Gas Engineers and the Board of Education. Their duties will be to advise the Institution and the Board upon all matters arising out of the scheme, and to exercise such powers as may from time to time be delegated to them.

BOARD OF EXAMINERS.

(*b*) A Board of Examiners nominated by the Institution to examine students in Gas Engineering and Gas Supply for the Advanced certificate, and for diplomas under Section III.

ASSESSORS.

(*c*) One or more assessors to moderate the questions and assess the marking of the papers in Gas Engineering and Gas Supply in the course for the ordinary certificate. An assessor may or may

not be a member of the Board of Examiners. He will hold office for three years, but will be eligible for re-election.

CONSULTATIVE COMMITTEE.

(*d*) A Consultative Committee, consisting of the members of the Advisory Committee, and such number of teachers as may be determined by the Advisory Committee.

The duties of this Committee will be

(i.) to meet the Board of Examiners in conference at least once a year;

(ii.) to act in a consultative capacity to the Board of Examiners;

(iii.) to consider and report upon any matter referred to them by the Advisory Committee.

SECTION II.—Supplementary Scheme of Examinations in Gas Engineering and Gas Supply.

To be conducted by the Institution of Gas Engineers (with the co-operation of the Board of Education).

CANDIDATES INELIGIBLE FOR INCLUSION UNDER SCHEME I.

1. In order to provide for the cases of the University student or articled pupil to whom the main scheme may be inapplicable, on the one hand, and, on the other, to meet those cases where they are satisfied that, for any sufficient reason, it has been impossible for any candidate to receive instruction in Gas Engineering or Gas Supply as a part of one of the group courses set out in Section I. of the scheme, the Institution may and should empower the Advisory Committee, set up under Section I., and the Examining Board, acting through the District Associations or Institutions by means of appropriate local committees, to arrange themselves for the examination of such students and award certificates on the result thereof.

2. Such examinations shall be of equal standard and held on the same date as those arranged for under the main scheme.

ORDINARY GRADE.

3. Students desiring to sit for examinations in the ordinary grade under this scheme must conform to the following conditions:

(*a*) Application to enter for the following examination must be made in writing to the Secretary of the Institution not later than Aug. 31 of any year.

(*b*) The candidate must produce a voucher showing that he has been engaged in the practical (as distinguished from the clerical) side of gas manufacture or gas supply for at least three years previously. But see note to para. 5 (*a*).

(*c*) The candidate must (i.) produce an ordinary grade national certificate in chemistry or mechanical engineering, or (ii.) supply evidence by (*a*) the actual certificates gained, or (*b*) a voucher from the principal of an approved technical school, that he has received and profited from instruction in any three of the following subjects: Mathematics, physics, chemistry, machine drawing, mechanics, or heat engines, to a standard not inferior to that of the third-year senior course of such school.

(*d*) That a guinea, or such other sum as may be decided upon by the Advisory Committee, shall be paid in advance by the candidate to cover the expense of the examination.

HIGHER CERTIFICATE.

4. As in the previous grade, any candidate wishing to sit for the following examination must apply in writing, enclosing the necessary examination fee, to the Secretary of the Institution, not later than Aug. 31 in any year.

5. Before being allowed to take the higher examination, candidates must satisfy the Advisory Committee:

(*a*) That they have been engaged in the practical (as distinguished from the clerical) work of gas manufacture or supply for at least five years previously.

NOTE.—In the case of articled pupils or University students, discretionary power shall be vested in the Advisory Committee to vary this term of five years (and also that of three years on the ordinary stage) should special cases in their opinion justify such modification.

(*b*) That they have passed the examination in the ordinary grade in either gas engineering or gas supply.

(*c*) That they have received and profited by further instruction in the ancillary subjects taken for the ordinary certificate, or in alternative ancillary subjects approved by the Institution and the Board.

6. The examination shall conform in standard to that of the higher examination under the main scheme, and be held upon the same date.

7. In both the ordinary and higher grades the Institution shall award special certificates, signed by its President and Secretary, to be called "The certificate of the Institution of Gas Engineers in Gas Engineering" (or "in Gas Supply"), indicating the grade of examination passed, and the ancillary subjects studied by the candidate to the satisfaction of the Institution. The standard for a pass in either Gas Engineering or Supply shall be 40 p.ct. of the highest possible. A candidate who secures 85 p.ct. of the highest possible will pass with distinction, and this shall be indicated on the certificate.

SECTION III.—Scheme for the Granting of Diplomas in Gas Engineering and Gas Supply by the Institution of Gas Engineers.

COURSE FOR DIPLOMA GRADE (ENGINEERING AND SUPPLY).

1. In view of the fact that the numbers desiring to sit for the diploma examination must of necessity be so small as not to justify technical institutes in providing courses for them, University courses, private study, practical work, and such coaching as may be available must be relied upon by candidates for the diploma.

2. The diploma may be granted in either Gas Engineering or Gas Supply, or both.

3. Entrance to this examination shall be restricted to those:

(*a*) Who are actually engaged in the industry.

(*b*) Who are 21 years of age or more.

(*c*) Who have passed the higher examination in both Gas Engineering and Gas Supply.

(*d*) Who have passed the matriculation examination of the London or Northern Universities, or possess the higher school certificate, A or B, or have attained such other educational qualifications of not lower standard, or pursued such course of studies, as may subsequently be recommended by the Advisory Committee, and agreed upon by the Institution of Gas Engineers and the Board of Education.

4. The examination for diploma shall be partly written and partly *vivâ voce*.

EXAMINATION FOR DIPLOMA.

The written portion shall consist of:

A series of questions based on the syllabus for the higher grade, with the addition of such further subjects as may be approved by the Advisory Committee, and such important recent developments in Gas Engineering and Supply as have been adequately described in the Technical Press.

ORIGINAL PAPERS.

In the subject of Gas Engineering, an original paper on some aspect or point of Gas-Works Construction or Gas Manufacture, and in the subject of Gas Supply, an original paper on some aspect or point of Gas Distribution, Supply, or Utilization shall be submitted by the candidate four weeks before the date of examinations.

(Should any question arise as to the suitability of the subject chosen, the widest possible interpretation shall be given to the above terms; but the judgment of the examiners thereon shall be final.)

VIVÂ-VOCE EXAMINATIONS.

5. The *vivâ-voce* portion of the examination in either Gas Engineering or Gas Supply shall be conducted by the Sub-Committee of the Examining Board for the subject taken.

6. This oral examination shall be directed to eliciting the candidate's personal acquaintance with the details of practice in either Engineering or Supply, which could not so well be determined by answers to a written question paper.

THE "COLUMBUS" WASTE-COKE RECOVERY APPARATUS.

The days are long since past when gas engineers could fire a high-grade fuel under their boilers and producers, and with magnificent disregard forsake their furnace ash in obscure dumps. Coal is too expensive and our resources in that commodity too limited. When it was first realized that the ash and clinker thus thrown away contained a large proportion of unburnt coke, picking by hand and the belt was introduced; but the high costs of labour have now ruled this out of court, and the demand for machinery to treat this material resulted in the introduction of the water-impulse washing plants now in use.

THE "COLUMBUS" PATENT SEPARATOR.

Through the courtesy of Mr. John Terrace, Chief Engineer and Manager of the South Suburban Gas Company, we have had an opportunity of seeing at work a separator the features of which are particularly novel, and it is felt that this apparatus should be brought before a wider section of the gas industry. We are advised that orders are already booked from several of the larger undertakings; but without a certain amount of publicity it will naturally take time for knowledge of this new machine to permeate the gas industry, and appeal (which is particularly desirable) to the small gas-works. Though applicable to undertakings of all sizes, we nevertheless consider that the possibilities of the "Columbus" plant offer an unusually attractive problem to the management of our small works throughout the country—a point which we hope to bring out in the course of this descriptive article. Before going into the construction and working of the apparatus, it would be well to enumerate some of the chief advantages claimed. In the first place, the plant succeeds eminently in achieving its main object, the recovery of whole coke from ¼ in. upwards. It is asserted that no clinker at all need come through mingled; and from our personal observation this would appear to be without exaggeration. Secondly, the separated coke contains the absolute minimum of moisture absorbed during the process, for it is in contact with water for only a second or two. This is clearly a most important point, for the difference in the calorific value in a pound of dry and a pound of wet coke is as much as 1200 B.Th U. In addition, the plant is very compact, strongly constructed, and inexpensive, and the requirements of power are low. The machines are made in three sizes. The smallest, the "A" type, has a capacity of 2 c.yds. of furnace ash per hour; and including motor power for an elevator (if employed) 3 H.P. will drive it. An addition of only 1 H.P. suffices for the "B" type, which has double the capacity; and a total of only 6 H.P. drives the "C" type apparatus, the capacity of which is 8 to 10 c.yds. of ash per hour. It may also be stated that provision has been made in the design for all parts liable to wear and tear to be easily watched, and replaced when necessary in a few hours.

DESCRIPTION OF PLANT.

The working of the plant will now be described, and attention is called to the photograph which is reproduced of the unit we have been able to view at work. This is a type B machine, dealing with something over 4 c.yds. of material per hour. The furnace ash is fed into a pit of 1¼ c.yds. capacity, whence it is picked up by a specially constructed elevator. The feature of the latter is its continuous feed and the provision of interlocking side-plates

in which the material remains absolutely at rest from the time it is picked up until it slides out into the feeder. The elevator is carried on an independent framework, and beyond a small excavation for the hopper entails no work in its erection. From the buckets the ash passes into a small-meshed drum, which extrudes all dust up to ¼ in. or thereabouts. Co-axial with this drum, and of the same external diameter, is a grid which picks out any lumps of abnormally large dimensions; and then the remainder of the material—clinker and whole coke up to 3½ or 4 in.—passes down into the separating chamber. This chamber forms what is really the essential of the patented plant and process, which claims the complete separation of the coke and clinker through the medium of their widely differing specific gravities.

The separating chamber consists of a small bath of water, the specific gravity of which is raised to a considerable point by the admixture of a small amount of chalk, clay, or other material low in first cost. In this bath are two worms, one dipping into the surface of the liquid at one end and quickly rising out of it, the other set along the bottom of the bath, which is made at an angle. The two are parallel, and find bearings in the main outside plates of the apparatus. As the material drops into the liquid, the lighter coke floats and is immediately propelled out of the liquid, and eventually delivered from a chute. The heavier material—the clinker and stones, &c.—drops to the bottom of the tank, is caught and carried off by the lower worm, and delivered through another chute.

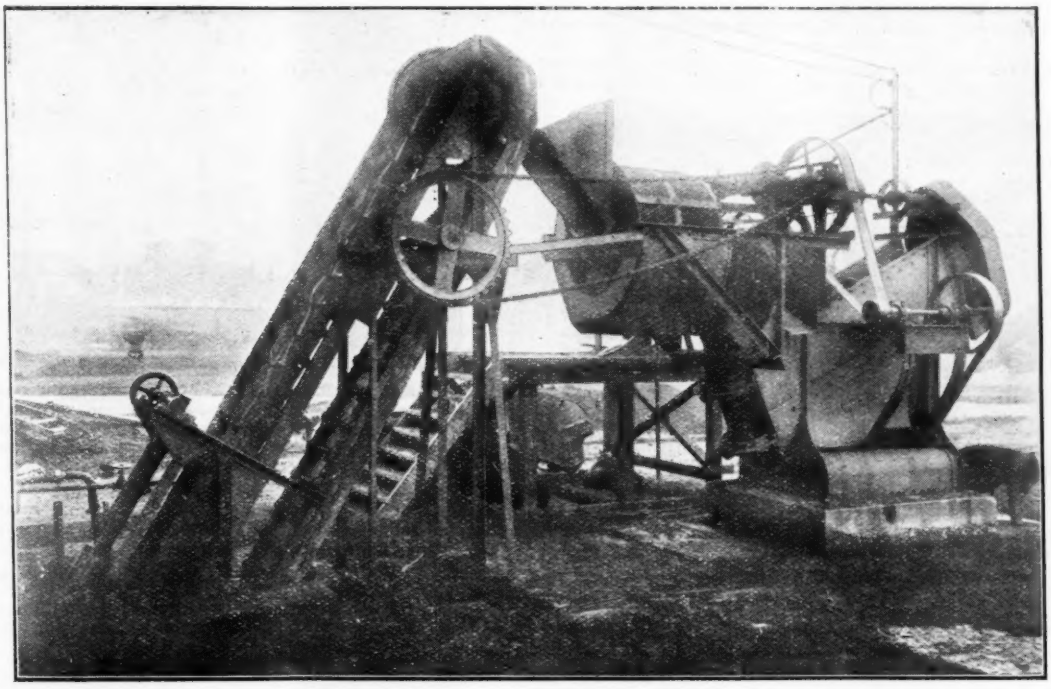
The bath itself only requires making-up to the extent of a few pints of liquid now and then, and for this purpose a mixing tank is supplied alongside the main apparatus. There is also a water supply through a ½-in. standpipe. It will be readily understood that only a very small intermittent quantity need be added to the bath, for the only loss of liquid is the amount which is taken out on the surface of the coke or clinker, and this is very small indeed. The bath is replenished with the mixture or with water according to the observations of the attendant. If he notices any clinker passing through with the coke, the inference is that the specific gravity of the liquid in the bath is too great, for the heavier material is evidently not finding its way sufficiently quickly to the lower worm. On the other hand, examination of the clinker chute delivery may reveal small pieces of good coke, which means that the tank liquid has attained too low a density. In the former case, all the attendant has to do is to run in a few pints of water from the standpipe; and in the latter case he admits make-up liquid from the mixing tank.

The mixing tank itself contains a chain-driven rotary propeller, which serves to keep the water and thickening material in a constant state of agitation. It may be objected that the separated coke is discoloured by the clay or other material added to the water; but the quantity which actually covers the material is infinitesimal, and a bucket of water suffices to wash clean quite a large quantity of it. The breaking-up of a lump of coke will emphasize this point, for the extent of the penetration of the mixing material is too small for the eye to appreciate. In the majority of cases the fuel thus separated will be used by the gas engineer in his own works; but in the event of his wishing to dispose of it, a simple demonstration should amply persuade the buyer that he is not receiving an inferior article. The effect in a furnace of the superficial covering of clay water on the coke is absolutely *nil*. However, there is an additional unit in the form of a washer, which can be supplied with this separator and run off the main shaft; but as a further alternative a chemical with a higher specific gravity than the water may be employed in the bath. The objections to the use of clay are so superfluous that its low cost should determine its almost universal employment. The motive power can be obtained from any source; but that supplied on the type B apparatus inspected had an electric motor fixed in the base of the apparatus itself. A cover-plate is fixed over the cavity, and the motor is thus completely protected from dirt and the elements. The switch may be arranged anywhere as most convenient to the workmen.

LABOUR AND LABOUR SAVING.

The labour required on this type B plant, through which is passed 4 c.yds. of material per hour, consisted of one unskilled labourer to operate and regulate the machine, and one boy to supervise the feed and delivery chutes. The plant seen having originally been put in as an experiment, the feed and output is moved by hand; but naturally, in the event of a permanent installation great advantages would ensue from an arrangement for the mechanical feeding of ash and removal of the separated materials.

Mention has already been made of the facility with which parts liable to wear and tear may be observed and replacements effected. There are only three parts of the separator which really can be placed in this category. These are the troughs in which the worms revolve, and the worms themselves. Nevertheless in each case the worm troughs are provided with a cast-iron liner, which may be removed and replaced in a very short time; while the worms themselves are constructed so that each turn of the screw is a separate piece which is easy to unbolt and substitute. The main bearing most liable to deterioration is the lower support of the bottom worm, and in this case the shaft is protected by an iron sleeve, which is renewable.

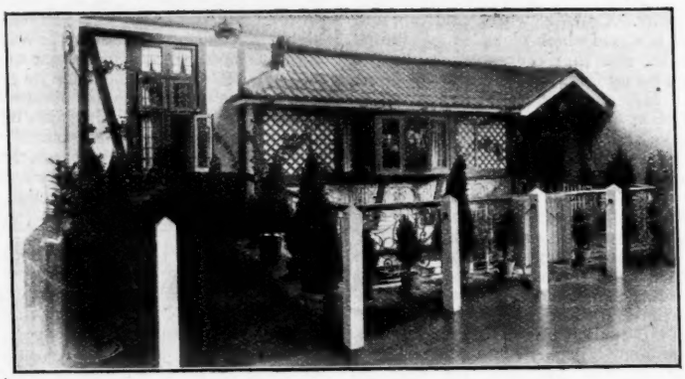


THE "COLUMBUS" WASTE-COKE SEPARATOR.

The over-all size of this type B machine is about 20 ft. by 4 ft. It is fixed on a concrete block set to ground level, and its total weight is barely 3 tons. In the case of very small works investing in a type A plant it may be pointed out that both the elevator and the foundation block could be dispensed with. The whole plant could be moved about without much difficulty, and simply put down where most convenient at the time. Some managers of small works might consider the outlay unjustifiable in their case; but we may point out that 2 tons 16½ cwt. of coke have been recovered by the type B machine from 9 c.yds. of materials in a two hours' throughput, and a yard labourer is sufficient to attend the smaller apparatus.

While the details as to actual working of this machine and its separation are the result of our own observation, we are indebted to Messrs. Rolland and Glenwalker, of No. 210, Caxton House, Westminster, for the information as to the various capacities and types of plant they are marketing.

THE "ALL-GAS" BUNGALOW.



The Croydon Gas Company are to be heartily congratulated on their latest piece of enterprise—co operation with Messrs. Allders, Ltd., of North End, Croydon, in preparing a most attractive example of one solution of to-day's housing problem. The present-day shortage and high cost of accommodation, combined with the post-war conditions of domestic service, have necessitated reducing building expenses and labour in the home to a minimum; and one outcome is the increasing popularity of the one-floor house with all-round gas service. Messrs. Allders have a

HALL.—Oak overmantel, with mauve glazed tiles forming the back and hearth, with armour bright gas-fire. Hall lamp outside controlled by a switch. Pendant with large inverted burner, silica cylinder, and shade (inside, controlled by a switch. Radiator—central heating off "Victor" combination gas and coke boiler in scullery.

large store at Croydon, and some 1200 sq. ft. of their first floor has been converted into a completely equipped nine-roomed bungalow. The work has been most tastefully carried out; even the outside railings and lawn, and the flagged path to the front door being reproduced. The most fastidious could take "immediate possession," and find every necessity and luxury at hand. The installation of gas for all purposes has been admirably executed by the Distribution and Sales Department of the Croydon Gas Company; and much business will undoubtedly accrue from the numerous inquiries made of their attendant salesmen.

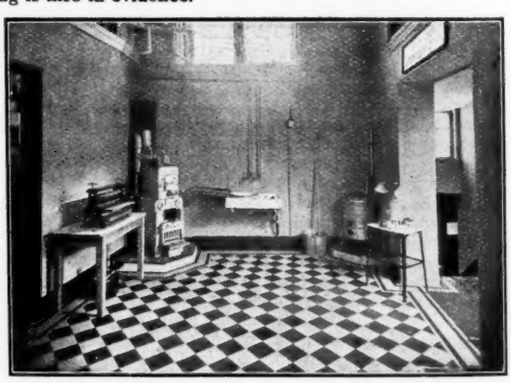
LOUNGE.—"Sunbeam" gas-fire in special rough red brick fire-place. Three-light silver pendant, with medium inverted burners, silica cylinders, and gold shades, controlled by a switch. Four silver brackets, with medium inverted bye-pass burners, silica cylinders, and gold shades.

THE LIVING ROOMS.

The excellence of the decorations and furniture is evident from the photographs which we are enabled, by the good offices of the Gas Company, to reproduce; and we shall confine ourselves to a

DINING ROOM.—Oak cabinet overmantel, with unglazed red tiles forming inside surround and hearth, and armour bright gas-fire. Oxidized-silver pendant carrying two large inverted burners with silica cylinders, 18-in. corona band, and pink silk shade, controlled by a switch. Two radiators.

description of the gas appliances installed. It may be mentioned that the mantels are by the Nautilus Fire Company. The front door opens into an entrance hall heated by a Davis 12-in. inset fire with tiled surround (all the fires have been lent by this firm), and lighted by a centre pendant with a closed bell shade in silk; the latter being made possible by the fitting round the mantle of a closed silica cup with side slits. A pedestal light with flexible tubing is also in evidence.



SCULLERY.—"Victor" combination gas and coke boiler. Gas incinerator on stand (the "Burn-All"). Ten-gallon gas-heated copper. Sink—hot water from "Victor" gas-boiler in kitchen recess.

The main living room is the lounge, on the left as one enters the house. It is commodious and beautifully furnished; but by far the most striking feature of the room is the fireplace of red brick, designed by the Department to accommodate a Wilson's "Sunbeam" gas-fire, and evincing great harmony in its construction. We understand that blue prints of this fireplace are being prepared, and that the Croydon Gas Company will be pleased to receive inquiries as to the construction and cost thereof. The

room is lighted primarily by a three-light pendant, while auxiliary wall brackets are fitted in each corner.

Passing straight through the entrance hall, the visitor finds himself in a model Jacobean dining room. A handsome oak mantel houses a "Period" type fire, with brick surround; and it was observed that the two-light pendant, with a silk flounce from the corona band, called for much remark from the public. Certainly the table lighting effect was excellent. Two hot-water radiators, worked off a "Victor" combination gas and coke boiler in the scullery, complete the gas equipment of this room.

COOKING AND HOT-WATER SUPPLY.

Taking the rooms in order, the next we come to is the scullery. Here a Potterton's "Victor Combination" boiler immediately calls for inspection. As is well known to our readers, this comprises both a coke and a gas unit, which is eminently convenient in that the coke unit can be kept going more or less continuously in cold weather, for the supply to radiators and the bath, while in summer the gas unit will suffice for intermittent firing for the domestic hot-water supply. The gas may also be used to

KITCHEN.—All-gas kitchen (cooker, fire, and boiler) in white-glazed ventilated recess, relieved with green-angle beading. Hearth in red quarries. Hot water storage tank at side contained within an airing cupboard. Gas-iron and special portable ironing table.

supplement the work of the coke. The sink seen in the scullery is piped off the kitchen storage tank; and in the photo may be seen a gas copper and a Davis "Burn-All" incinerator.

The photograph of the kitchen reveals that gas has all its own way there. The recess is of white glazed tiles relieved by a green angle beading, and it is surmounted with a wrought-iron canopy discharging in a 9 in. by 9 in. flue. The cooker is a Richmond's "Bungalow" No. 3, with enamelled stand, and with plate rack and wall plate, and above the gas-fire on the right may be seen the Potterton No. 92 "H" series boiler, working in connection with a 25 gallon storage tank in the linen cupboard next to the recess. This boiler fulfils the dual purpose of heating the linen cupboard storage tank, and supplying hot water, with its secondary circulation, to a bath, hand basin, and the scullery sink. In addition it warms a nickel-plated towel rail in the bathroom. Furthermore, a cut-out valve on the tank allows for the preparation of a reduced supply of hot water to the scullery sink and lavatory basin when baths are not required. The Croydon Gas Company arrange to supply a specially constructed ironing table for use in conjunction with a gas-iron, and this too may be seen in the photograph we reproduce.

BATHROOM AND BEDROOMS.

The bathroom is plutocratic. The fittings (with the exception of the geyser) are by Messrs. Emanuel and Sons, Ltd., and the glazed wall material by the Emdeca Metal Decoration Co., Ltd. The geyser is one of the Gas Company's own design—an improved "open" type machine.

The remaining accommodation comprises two bedrooms and a night nursery, wherein several points of interest assert themselves. It was observed that the inset gas-fires in the bedrooms are built on an angle in each case, and these angles of the two rooms back upon each other; the resultant economy in construction being readily realized. The feature of the bedroom lighting is the provision of pneumatic switches for the bedside fittings.

BATHROOM.—Lavatory basin supplied from "Victor" boiler in kitchen recess. Bath, shower, and towel-drier supplied off "Victor" boiler. Geyser—as an alternative method of obtaining a hot bath. Bathroom finished in "Emdeca" covering.

As for the night nursery, we feel the student of eugenics would be more qualified than ourselves to discourse on the general scheme of decoration—Peter Pan and strange creatures of the woodland taking a lively part therein. Suffice it for us to remark that the workaday gas-fire is in perfect keeping with the rest. It is in pale blue enamel with "tile" surround to match; but the latter is but a cement slab, ingeniously contrived and enamelled pale blue. A fire-guard suitable for nursery contingencies is supplied; and a pedestal boiling-burner is connected to the fire supply.

As remarked above, the Distribution and Sales Department of the Croydon Gas Company are to be congratulated on sound enterprise tastefully and efficiently put into effect. Anyone interested in gas, its sale or its consumption, should pay Messrs. Allders' store a visit, if it is in any way possible. The time will not be wasted.

SOCIETY OF BRITISH GAS INDUSTRIES.

AUTUMN GENERAL MEETING.

The Autumn General Meeting of the Society was held last Thursday, at the Holborn Restaurant, W.C. Before the business meeting there was a luncheon, with the Rt. Hon. Lord RIDDELL, the President, in the chair. He was supported by the Chairman of the Council (Mr. Albert Cliff, J.P.), Sir Arthur Duckham, and the members of the Council. There were also several visitors present, including Mr. Arthur Kitson (President of the Banking Reform League), who later in the proceedings was to read a paper on "Finance and Unemployment."

At the close of the lunch, the Loyal Toast having been honoured,

Mr. ALBERT CLIFF said he was sure the members would desire to express the generous regard they all had for their President. Lord Riddell had been at some pains on occasion to explain that he was not an expert in gas manufacture; but he thought their President would begin to feel something at any rate of the mind of an engineer. It was a great piece of daring on the part of his (Mr. Cliff's) predecessor in office to ask his Lordship to continue to occupy the presidency for a second year. Lesser men had felt the strain of recent years; and duty had never been far from any one of them. He had therefore much pleasure in expressing the gratitude of the Council and of the members for the very fine-spirited way in which Lord Riddell agreed to give to the Society further valuable support. He (Mr. Cliff) had in mind the happy and wise speeches they had had from their President; and he did not think any member would come up against so much personal force without adding to his own resources. That brought him to this: They as members of the Society met together, and achieved more than it was possible for them to do single-handed. The real test of a Society was this—that, after their meetings together, they all went back to their respective places in life strengthened in their own individual state and effort to push on. He asked the members to drink to the health of their President.

The toast was heartily honoured.

The PRESIDENT, in responding, said he was very much obliged to Mr. Cliff for the kind things he had said concerning him. He appreciated them greatly. He was also thankful to the members for the gracious manner in which they had received the toast, and for the way in which they had treated him during his presidency. He thought, however, the obligation was all on one side; for he had had very few official duties to perform, and he had had many pleasant functions at which to be present—not only in London, but in the provinces. But above all he had gained a great deal of knowledge from his association with the gas industry—in fact, he believed he was the only man in the country outside the gas industry who really understood what a therm was. [Laughter.] While a great many gentlemen interested in the gas industry, being engineers, understood what a therm was, they did not perhaps consider much about their methods of expression, and seemed to be unable to communicate their knowledge to the public in an intelligible form. While President, he had met a great many gas experts; and by the adoption of suitable methods of cross-examination, he had at last ascertained exactly the value of a therm. [Laughter.] In conclusion, he said that he indeed felt it a great honour to have been asked to occupy the Presidential chair of the Society, and especially so for a second year. The Society incorporated a large number of personal friends for whom he had the highest regard.

Mr. F. C. TILLEY proposed the toast of "The Visitors," whom the members heartily welcomed. With the toast he coupled the name of Mr. Kitson.

Mr. KITSON, in thanking the members, reminded them that in his early days he was also connected with the gas industry, having invented one or two things which the members probably knew. His name was connected, for instance, with the invention of suction-gas

producers. He had had a considerable amount to do with the American gas industry; and he was a member of their Gas Association. He sold his business to the United Gas Improvement Company. He remembered Prof. Lowe, the inventor of water gas. He had much to do with him when experimenting with blue water gas and the platinum gauze incandescent burner. It was afterwards that he (the speaker) invented the Kitson oil-burner, which is now largely used in lighthouses. He was present that day because of his friendship with the Chairman of their Council (Mr. Cliff), who occupied an important position. He was for two years their Mayor, and was also a member of the County Council. He filled a high and honourable position in the municipal politics of Lincolnshire. ["Hear, hear."]

THE BUSINESS MEETING.

The business meeting was subsequently held—Mr. ALBERT CLIFF, J.P. (the Chairman of the Council), presiding.

APOLOGIES FOR ABSENCE.

Among those apologizing for absence from the meeting were Lord Leverbulme, Sir Dugald Clerk, Sir Robert Hadfield, Prof. Arthur Smithells, Sir Henry E. Duke, Sir Alfred Keogh, Prof. Harold B. Dixon, Mr. R. M. Holland-Martin (Treasurer of the Institute of Bankers), Mr. William Cash (President of the Institute of Chartered Accountants), Mr. R. T. Nugent (Director of the Federation of British Industries), and Alderman Fred. J. West, Mr. J. W. Broadhead, and Mr. A. P. Main (Past Chairmen of the Council).

Report of the Chairman of the Council.

The CHAIRMAN said the first item on the agenda was his report on the Society's work during the past six months. This he proceeded to read as follows.

Business was considerably handicapped during the earlier months owing to the engineering dispute. While the prospects of trade are somewhat brighter, there still remains at almost every centre a large volume of unemployment, covering short work, short time, and out-of-work conditions, accompanied by the attendant evils of poverty and distress.

Many of our members are rendering public services to the communities where they reside; and the causes and consequences of this unemployment are a daily burden and anxiety. The problem is of the greatest local and national importance, affecting large bodies of efficient men whose work in normal times is of great economic value; also adversely affecting large numbers lacking capacity and otherwise inefficient. So far we appear to have been powerless to do more than alleviate, and in some measure to diminish and soften, the effects of these gigantic evils. In these circumstances, any proposals which are sincerely held to promise a remedy command our interest, and have a fair claim to careful consideration.

MINISTRY OF HEALTH AND LOANS FOR EXTENSIONS.

The position in regard to this is considered by the Council of of your Society to have undergone a somewhat rapid change for the better. We desire to thank Sir Arthur Duckham for valuable services in regard to this matter. With characteristic energy of mind, he was prepared with a plan. It is entirely owing to the situation having improved that further action in the matter has been suspended.

REVISION OF GENERAL RAILWAY CLASSIFICATION OF GOODS.

The work of our Committee has been concluded, and our thanks are due to them for their services extending over many months. The traders are considerably indebted to Mr. Drage, of the Federation of British Industries, who has had charge of the arrangements and been present at the meetings between the traders; also the meetings with the railway companies, and at the Rates Advisory Committee hearings. This co-ordination has smoothed and considerably expedited matters alike for the traders, the railway companies, and the Rates Advisory Committee.

In order to keep members posted up with particulars of the various alterations in the railway charges, and as to how the arrangements for setting-up the new classification and rates are proceeding, Mr. Holt, of Messrs. Tweedy and Holt, Railway Rate Experts, of Halifax, who has acted as Secretary to our Committee dealing with the railway classification matters, has kindly agreed to send us a quarterly report for our bulletin.

STANDARD GAS-VALVE FLANGES.

This question was referred to in the report presented at the annual meeting in May. The Sub-Committee dealing with the matter have had further meetings, and have now adopted a new standard for gas-valve flanges, which it is believed will be acceptable to the gas companies. The conclusions arrived at by the Sub-Committee have been approved by our Council, and a satisfactory conference was recently held with a Committee of the Institution of Gas Engineers, whose Council are in general agreement with the standards proposed. When the proposal is finally approved by the Institution, it will be submitted to the British Engineering Standards Association for adoption.

REVISION OF STANDARD SPECIFICATION FOR REFRACTORY MATERIALS.

Conferences have taken place of the Joint Committee on Refractory Materials, to bring the standard specification of fireclay goods up-to-date. The revision is about complete. For a considerable number of years your Society has co-operated in this imporant work. It is the only British standard.

STANDARD GAS-COOKERS.

The report on gas cookers of the Standardization Committee of the National Gas Council has been issued, together with the adopted specification, and fully reported in the Technical Press. Invitations for tenders have since been issued by the National Gas Council.

GAS LIGHTING.

A Joint Committee has been set up, consisting of six representatives each of the British Commercial Gas Association and the Lighting Section of our Society, to consider what steps can be taken:

(*a*) Towards the standardization of the essential parts of the burner.
(*b*) Towards the elimination of shoddy burners, mantles, and fittings from the market.
(*c*) Towards the maintenance and development of gas lighting.

Good progress has been made with the subject of burner standardization, and the "B.C.G.A." hope to publish a report on the matter at an early date.

STANDARD CAPACITY METERS.

The Life of Meters Committee presented their annual report at the annual meeting of the Institution of Gas Engineers. The last section of the report traces the origin of the demand for a standard capacity meter, the steps taken by the Committee in the matter, with particulars of the sizes of cases and connections, and a comparative table of capacities and prices of the old and new types of dry meters. This section was considered to be of sufficient interest and importance to warrant its being reprinted in a convenient form, and circulated to the gas undertakings of the United Kingdom. This has accordingly been done under the auspices of the Society, and copies of the pamphlet (which are still available) may be had from the Secretary.

BULLETIN.

This has been issued quarterly, and we trust it has proved useful and interesting to the members. If members can find time to send an occasional paragraph of ideas bearing on the interests of the Society, or helping forward the solution of difficulties, or stimulating us with an occasional touch of always needful inspiration to do better—in short, anything calculated to make the Bulletin, within its limits, the chief oracle of its kind in our industry—such co-operation would be cordially welcomed by the Secretary.

We note with pleasure the visits of gas engineering associations to the works of our members. The practice should be widely encouraged. As regards the visits of the Junior Gas Associations, it is in the power of the members of this Society to contribute materially to the education of the rising generation in the gas profession, by giving them some insight into the manufacture of products which they are destined either to distribute or control.

The CHAIRMAN said it was with great pleasure that they welcomed Mr. Arthur Kitson to the meeting, to give them an address on a very important matter.

Mr. ARTHUR KITSON then proceeded to address the meeting on the subject of "Finance and Unemployment." He spoke without the aid of notes, but the greater part of the previously prepared presentation of the arguments he placed before the meeting, with some points from the discussion, is reproduced below. Mr. Kitson admitted that the whole subject is very intricate, and very involved, and said he could do no more in one address than endeavour to get the members interested in the subject, so that they might study it for themselves. It was the most pressing question that had to be dealt with at the present time.

Mr. FALCONER LARKWORTHY, C.O.R. (late Chairman of the Ionian Bank, Ltd.), who was present at the meeting, had also prepared a statement which was circulated among the members, and in which he indicated one scheme for the solution of complicated financial and economic problems. He said that the aim generally should be that the currency depreciation should be prevented in the future, and the instantaneous transfer of representative wealth at little or no cost be effected throughout the world wherever the system to which he referred is in force, and that the enormous profits which would accrue should be distributed *pro ratâ* between the nations interested, reckoned on the basis of their average circulation per annum of the international currency to be arranged.

FINANCE AND UNEMPLOYMENT.

Those in touch with world politics are aware that civilization is to-day confronted with the gravest perils ever encountered since the fall of the Roman Empire. Although economic in origin, these dangers affect the political safety and existence of all nations; and unless some speedy settlement of our industrial problems is found, future wars, much more terrible than the war from which we have just emerged, will ensue. Civilization may perish; and another, darker, and more terrible thousand-year-night will commence.

Are we or our descendants destined to witness a repetition of that awful catastrophe? This will depend upon whether the Governments and the people take heed of the warnings sounded. Already we see signs of the approaching cataclysm in the universal discontent prevailing, due to the vast armies of unemployed; the

uncertainty of food supplies; the co-existence side by side of enormous wealth and abject poverty; the fact that in the presence of an almost unlimited supply of all the prime factors of wealth production, the masses of mankind are on the verge of starvation; and the knowledge that while Governments can always furnish ample funds for the purposes of war and destruction, they invariably plead poverty and inability to finance any and all undertakings for creating wealth, building homes, educating the children, and carrying out schemes for the welfare of the people.

Much has been said and written in condemnation of the threatening attitude of Labour, the spread of Socialism, and the rise of Bolshevism. But whatever may be said of the authors of these movements, we must admit that without the existence of a suitable soil of discontent the seeds sown could bring forth no fruit. The strength and safety of nations depend upon the contentment of the people, and contentment is the natural result of good economic conditions. During the war our rulers—prompted, no doubt, by honest intentions—promised to provide these desirable conditions; and to their utter failure to keep their promises, very much of the present discontent may be traced.

OUR ECONOMIC POSITION.

Our economic position is very remarkable. There is an abundance of all the prime factors of wealth production, labour, and natural facilities—soil, minerals, and vegetables. Capital is so abundant that the Government have been hard pressed to find purchasers for the enormous quantities of tools, machinery, and factories of every description left over from the war. Millions of pounds worth of capital have been destroyed and sold as junk. Yet with all these facilities for creating wealth, debts—national, municipal, and private—are increasing enormously. We have the largest army of unemployed in our history, and naked want stalks throughout the land! In short, England, with its mighty Empire, is falling into decay, and is in danger of perishing in the midst of plenty. Unlike our ally France we—together with the United States—emerged from the war far wealthier in productive facilities (which is the real basis of credit) than when we entered it, for we added to our pre-war capacity by the creation of innumerable new factories and plants of every description, and enlarged all our pre-war factories.

PRODUCTIVE CAPACITY AND CONSUMPTIVE NEEDS.

Few people realize the marvellous productive capacities of this country. Although we released millions of factory and farm operatives for the army and navy, millions were found to take their places; and in spite of the destructiveness of war, we not only furnished the bulk of our war munitions and much of those of our allies, but we greatly increased our home-grown food supplies and raised the standard of living in the homes of the masses. For the first time in our industrial history we abolished unemployment, and increased our output nearly 400 p.ct. What is it that enabled us to do all this? First, the enthusiasm of the whole people; secondly, the organization of our productive facilities; and thirdly, and principally, the absence of credit restrictions. There was an abundance of purchasing power coupled with an unlimited demand. If the Government had employed the same factors after peace was declared for the creation of real wealth—the munitions of life—they could have rebuilt every industrial city and town, converted our slums into garden cities, abolished want, and made this England of ours a demi-paradise. Instead of this, they pursued the very opposite policy; and within two years after achieving the greatest industrial results in history, we have been brought back to the worst of our pre-war periods of distress, and in spite of our enormously increased resources, our national output of wealth is far below that of 1912 and 1913.

Similar conditions are noticeable in our Colonies and the United States. If there is one lesson above all others which the war taught us as essential for our future prosperity, it is that the productive capacities of all industrial countries are far in excess of the consumptive needs of their inhabitants. In short, the present era of want and unemployment is not due to any natural cause nor to our inability to produce ample goods for all our needs—it is due wholly to artificial restrictions for which the Government, especially the Treasury officials, are mainly responsible!

RELATION OF FINANCE TO TRADE AND INDUSTRY.

Our modern economic system has made the use of currency (*i.e.*, legal tender and bank credit-cheques, &c.) obligatory. No one can carry on a business of any description without a command of currency sufficient for maintaining business. Wages, taxes, bank interest, and debts of every description must be paid either in bank credit or legal tender. And yet no English Government has ever taken the trouble to ascertain what the national currency needs are. In pre-war days our money supplies were governed by accidental gold discoveries, the bank rate (which is altered at the caprice of the Directors of that private trading company known as the Bank of England), political events (both domestic and foreign), foreign and domestic speculators, and the currency needs of foreign countries. The result was that we had the most variable bank rate in the world; and our trade prosperity was largely at the mercy of our foreign trade rivals, who were allowed to withdraw gold from our free gold market (the only free market in the world), and thus penalize our merchants and manufacturers by causing a rise in the bank rate. It has been estimated that every rise of 1 p.ct. in the bank rate taxes our business classes to the extent of at least £100,000 per week. But this is the least of the evils inflicted. The export of gold compelled the banks to curtail bank credit, which rests upon the unstable and insignificant basis of legal tender—gold, treasury notes, &c.; and upon bank credit we are forced to build our trade, commerce, and industries. Now, by reducing the volume of legal tender, whether by exporting gold or destroying treasury notes, the volume of credit is reduced in the ratio of credit to legal tender. No banker will issue more than a certain proportion of credit to legal tender. Suppose this proportion is 10 to 1. Then, if the banker holds £1,000,000 in gold or treasury notes, he may issue £10,000,000 of credit. If for any reason he has to reduce his cash reserves to (say) £750,000, he must call in 25 p.ct. of his loans—viz., £2,500,000. And this reduction of loans is the inevitable cause of business failures, decreased trade, and unemployment. Some years ago a gang of New York speculators withdrew £11,000,000 of gold from the Bank of England within the space of a few weeks. The result was, according to the "Bankers Magazine," a doubling of our bank rate, and the fall in the prices of 325 of our premier securities, a sum equivalent to £115,509 000! Is it any wonder that the movements of gold were watched in pre-war days with such feverish anxiety? It is this stupidly suicidal system which the Government officials and the Sound Currency League are endeavouring to restore.

Now, since legal purchasing power is so essential to trade, how does it reach the great bulk of our population? The answer is in the form of wages, salaries, dividends, doles, and pensions. And so far as our domestic trade is concerned, the volume of such trade is limited to the amounts so distributed. It is therefore evident that the more money so distributed, the better for trade, provided, of course, that the level of prices does not rise in the same proportion. Hence the recent reduction of wages and the cutting-off of Government departments are not calculated to improve our industrial conditions—unless we are able to gain to a greater proportion in our foreign trade. The more money our people have, the more goods they can buy. On the other hand, the less they receive the less the demand for commodities.

A thoroughly scientific industrial and financial system would be one in which the amount of money distributed was sufficient to enable the public to buy all the goods the country is capable of producing. This would require not merely a sufficient supply of currency, but a regulation and limitation of prices. Now, it is evident to the least intelligent that our present financial system is based upon no rational theory connected with the national wellbeing. It exists merely because of greed and cupidity on the one hand, and superstition and dense ignorance on the other.

MONEY A SOCIAL INSTRUMENT.

Money—whether legal tender or bank credit—is a social instrument. It forms no part of the national wealth, although it is a source of wealth to thousands of individuals. Money is not wealth *per se*, but merely a claim or title to wealth. It was termed by ancient writers a ticket, a token, a counter. It is merely the mechanism or the medium of exchange; and its manufacture and supply should belong to the nation—the public, who, by using and honouring it, give it its value. But Governments have handed over this supremely important power of manufacturing and controlling the currency to private companies; so that to-day it is a rigid monopoly, controlled in this country by about ten banking institutions. And the directors of these joint stock companies are given power over the lives and fortunes of the whole of our people. The world's greatest and most dangerous monopoly is the monopoly of currency. During the great bi-metallic controversy in America, Senator Depew, in a speech in the Senate, said there were fifty men in the United States who could paralyze the entire industrial system of America because of their control of the money supplies through the banking system. The same power is concentrated in just as few hands in this country. The control of money gives to a few men the power to build up or to destroy whole nations!

THE EVIL OF OUR DEFLATION POLICY.

That the present era of unemployment is the result of our bad financial system, may be seen from recent events. All through the war our industries flourished, and for 18 months after the Armistice we had commercial prosperity. But no sooner had the Government announced its intention of deflating the currency than trade sickened and shrank to a fraction of its former volume. The trade slump started the day after Mr. Austen Chamberlain announced that the Government had "set its heart" upon the deflation policy; and he called upon the bankers to assist him by restricting credit and raising the bank rate! A more deadly blow to our trade and industries cannot be imagined; and the results of this policy have cost us, in the loss of trade and shrinkage of values, as much as the whole of our expenses during the war. Wherever this policy has been pursued, it has resulted in industrial ruin, paralysis of trade, unemployment and general misery. On the other hand, we see France and Belgium almost free from the scourge of unemployment, due to the refusal of their Governments to join us in this mad policy of currency contraction. Germany, who lost the war and has been heralded as on the verge of bankruptcy for the past four years, is prospering like the green bay tree. She has no unemployed; her factories are all running full time; and she is rapidly regaining her pre-war industrial and trade prestige. One wonders what form of midsummer madness led our foolish Government to adopt a system so disastrous, so paralyzing!

This deflation policy has not only paralyzed trade, but it has enormously added to the burden of our national, municipal, and

private debts. Indeed, it represents one of the worst forms of robbery that could possibly be committed. The great war debt was incurred in pounds which varied down to 8s. of the pre-war pound. When the Government invited subscriptions to the war loans, the financiers and investors subscribed the pounds that were then in circulation—viz., what they were fond of calling 8s. and 10s. pounds—and on this basis the National Debt has gone up to nearly £8,000,000,000. But the Government have now decreed that instead of repaying these loans in money of the same value as that loaned to us, the taxpayers are to be compelled to pay in pre-war pounds of double the value of those loaned. This means that instead of our National Debt being £8,000,000,000 it becomes £16,000,000,000 on the basis of the money originally subscribed. Put in another way, when the war ended, our National Debt represented about a quarter of the national wealth; but under the deflation scheme this debt has become equal to one-half of the national wealth; and the interest charges, of course, are advanced in a similar ratio.

How is it possible, with our ruined trade, to bear this enormous burden? The country has therefore not only been deprived of a large portion of the means for repaying debts; but these debts have been practically doubled. Is it any wonder that the country is discontented, and that trade is in such a disastrous condition? Is there any remedy for trade depression? Is unemployment a necessarily unavoidable condition of progress? I maintain that it is not. Not only is it not necessary, but, under a rational financial system, there would be no unemployment and no want. Orthodox political economy has tackled the problems, and has admitted that there is no solution. In other words, it is self-confessedly bankrupt. But political economy is supposed to be a science; and the test of a science is prevision—the ability to forecast events and to provide against disaster. The forecasts of the Government experts and of the orthodox professors have been falsified by events. The recommendations of the Cunliffe Currency Committee were for the purpose of restoring normal conditions. Instead of doing this, however, they have paralyzed industry, and reduced the country to its present deplorable condition. The writer warned the Government and the members of the Cunliffe Currency Committee, when their report was first published, as to what would be the consequences. As far back as 1915 I warned the Government against attempting to deflate the currency after the war; and I predicted that, if it were attempted, we should have unemployment, and general trade depression. There can be no final relief or solution of these problems until our banking system is completely changed. We cannot afford to continue to carry on the trade and industries of a great country like this on a margin of bankruptcy.

The chief evil, however, is this—that the amount of purchasing power distributed in the production of goods is not sufficient to purchase the products that are turned out. The consequence is that we are unable to buy our own products, and are continually seeking foreign markets, notwithstanding that our own people are in need of the goods which we are trying to export. War is the great consumer; and hence thousands of people look forward to a war as the only means of levelling-up conditions and creating a great demand for goods. It is a terrible indictment on our civilization that the wellbeing of the people can only be maintained by occasional warfare. The problem is quite capable of solution. There must be more purchasing power and a better distribution, sufficient to enable the people to buy more goods. This can only be brought about by an increase in the currency supplies and the restriction of prices. One method has been suggested by my friend Major Douglas, and is already occupying the attention of the Canadian and Japanese Governments; and it is quite likely that a trial will shortly be made. At any rate we have either got to solve this problem or the problem will wind-up civilization. We cannot stand still. We must either go forward or go under. Which is it to be?

DISCUSSION.

Alderman F. TEMPLER DEPREE said the address made him feel a good deal of concern, because it seemed to strike entirely a pessimistic note. He much preferred to take the view that Lord Riddell had voiced at Bristol, when he said that he travelled about a good deal, and wherever he went the Englishman was holding his own, and that there was not a finer race in the world than the Englishmen. Mr. Kitson would have them believe that the bankers were all wrong; and yet during the war, where would some of them have been without the bankers? It was suggested by Mr. Kitson that they had an abundance of wealth-producing factors. So they had; but they had not the markets. The soaring exchanges had closed many foreign markets, and the home market was restricted, due largely to the exactions of Government taxation. No doubt all of them would like to get Government taxation down. Then Mr. Kitson went on to say that debts—national, municipal, and private—were increasing enormously. Was this so? He rather thought the Chancellor recently claimed that over £800,000,000 of national debt had been repaid. Certainly local rates were generally lower; and this could hardly be the case if debts were increasing. Of private debts knowledge was not so precise; but it was certain that never were so many motor cars on the road, never were so many farms and houses bought, never were people so well fed and clothed, never were there so many places of entertainment open or football matches so well attended, and never was such provision made for the sick and unemployed as existed to-day. If "naked want was stalking through the land," as stated, where was it? He could not understand the statement that, "unlike our ally, France, we—together with the United States—emerged from the war far wealthier in productive facilities than when we entered it." Both the United States and this country added considerably to their productive plant; but so did France. Granted the North of France was largely devastated, they must be fair and look at what the Peace Treaty gave France. The iron mines of Alsace and Lorraine alone enabled her to export 2,000,000 tons of pig iron in 1920, whereas she was previously an importer. Then they must consider the potash deposits, the coal in the Saar Basin, and the coal Germany had to send her under the Peace Treaty terms. They must remember, too, that France entered into these districts with the iron and potash producing plant intact. The German workers went home, and the French were hard put to it to find the necessary men for the work. When speaking of unemployment, it must be recollected that France had almost a million men under arms, whereas this country had but a tenth of that number. France took over a large manufacturing district with its markets. This country had ceased manufacturing for export, and had to find fresh markets. This country lost the French market for iron, because Alsace and Lorraine gave them more than they wanted for home consumption, and they now competed with England for neutral markets to sell the remainder. They must not make the mistake of comparing things which were not similar. So much, then, for the apparent prosperity of France; but her Chancellor had stated that it would be necessary this year to borrow 1,600,000,000 frs. to balance her budget. He did not think this country was in that position at the present time. Again, he took exception to the remarks on money. They were told: "It is evident to the least intelligent that our present financial system is based upon no national theory connected with the national wellbeing. It exists merely because of greed and cupidity on the one hand, and superstition and dense ignorance on the other." He did not believe anything of the sort. He did not yet see that Mr. Kitson was right, and that all the other men were wrong. Of all the nations engaged in the great war, this country was in the best position financially to-day. Not only did it finance itself during the war, but it lent very large sums of money to its Allies; and when the time came that this country could no longer finance them, its credit was so good with America that the money was lent to England to lend to her Allies, whereas the credit of the Allies was not considered good enough. This predominant fact was an outstanding tribute to the soundness of the British banking system, and to Britain's world-wide credit. It could not be the result either of "selfish greed or superstition and dense ignorance." The British sovereign was worth 20s. in value as a piece of gold; and British silver coins were worth face value as pieces of silver. The world knew a good thing when it saw it, and accepted this country's gold and silver coins gladly.

Sir WILLIAM JONES said he felt that the cataclysm which Mr. Kitson predicted this country was in for unless it changed its ways, would be much more likely to overtake it in the immediate future if the country adopted the principle which Mr. Kitson had enunciated that afternoon. He thought that deflation had been a very good thing indeed for this country. It seemed to him that the alternative course to this was to adopt a system of inflation of currency; and what had been seen in various directions as regarded the inflation of currency of other nations would be hardly likely to make this country wish to follow along that line of action. The acid test of a nation's status was its credit, and the acid test of a nation's credit was its currency value in relation to that of other nations. In this respect, one could argue without great difficulty that the deflation of this country's currency had shown at any rate that the relation which this country occupied towards other countries had been in the ascendant rather than the descendant since this deflation was resolved upon. Mr. Kitson showed a diagram which was perhaps an unfortunate one, for it would be rather difficult to stabilize an inverted cone. He himself would prefer to illustrate this country's position by a gasholder and tank resting upon their foundation. He would say that the foundation was the gold held by the country; that the tank was its credit; and that the holder itself represented the fluctuations of its commerce. If one reduced the foundation, one must be satisfied with a smaller tank and a smaller holder. When this reduction was begun, one might expect instability as regarded credit and commerce. Allusion had been made to the position of France and Germany as regarded unemployment, and Alderman Depree had dealt pretty effectively with the matter as far as France was concerned. France was engaged, with a far smaller male population than previously, in rehabilitating her devastated areas. If France had little unemployment, the fact remained that she was unable, by a huge sum, to balance her budget last year or this. As to Germany, he (the speaker) had been there several times lately; and though the people might be working, there was nothing of prosperity in the position of these people. This country was not self-supporting, and its position of indebtedness to the world was due to the necessity during the war of purchasing everything heavily from the United States, and promising to pay later on. This had to be done. He thought the cure for unemployment was not the inflation of the currency. The country had lost a quarter of the wealth that was the accumulation of centuries; and this could not be restored in a month, or a year. The only way in which it could be done was by deflating the currency, so that the exchange became of greater relative value. This would enable the country to compete with the other industrial countries of the world for the business obtainable outside.

Mr. JOHN S. HECHT (a Fellow of the Royal Economic Society) said Mr. Kitson quite correctly pointed out the dangers of deflation; but it did not follow, because he did so, that he advocated inflation. Wealth did not consist in money at all, but in material commodities. Money had only one important feature; the value should be kept constant. Any deflation or any inflation hurt somebody. But even if the value of money was kept constant, they had not solved the question of unemployment. Unemployment had only existed since the subdivision of labour became general. The members of the Society found organization and co-operation in their own industry essential; but if they considered the industry of the whole country, it was evident that organization and co-operation were equally necessary. Instead of this, however, they found every industry fighting every other industry, every trade union fighting every other trade union, and every class fighting every other class. The only cure for unemployment was the control of every industry by a committee of that industry. If (say) the engineering industry got together, and said: "We know the

demands of our home market, and will divide that work *pro ratâ* with the present output," every member would have an opportunity of selling all he produced. The next thing was to form a committee of all industries, who would decide the wages for every industry. Why, for instance, should an agricultural labourer be paid so much less than a dock labourer?

Mr. G. EMPEDOCLES said he thought it would be found in a short time that the policy of deflation which had been applied in this country, though painful, was the correct one, and that satisfaction would later on be derived from it.

Mr. J. W. SCOTT remarked that in the course of his duties during the past year or two, he had come across many cases of people who were fairly well off before the war, but who, owing to the fall in the value of the pound, at one time found it difficult to live. The rehabilitation of the pound had made it possible for these people to maintain themselves, and therefore he thought getting back to the pre-war value was the right thing.

Sir ARTHUR DUCKHAM said he agreed with most of the remarks that had already been made by his partner, Sir William Jones. Personally, he would not change this country's position for that of Germany, France, or even America to-day. He had been a great deal in France, and had seen that the non-unemployment there was due to special reasons. The position in Germany was a fictitious one. It was a prosperous position, so long as they could make their people in Germany take the mark at four times its outside value. Then they could compete against the world; but so soon as they had to pay their workpeople the external value of the mark, there would be no more need to fear competition from Germany. He failed to understand Mr. Kitson, though he himself had taken an interest in industrial economy. They were, at the same time, very appreciative of his coming there to address them, because, however much they might disagree in the thought that had been put before them, the food for reflection and discussion that it offered was of the greatest value. Mr. Kitson had remarked that there were millions of unemployed in this country. Though there were a lot, he (the speaker) did not think it ran into millions. But for the incidence of the excess profits duty in the last period, the slump would not have been so great.

Mr. KITSON, in reply, said he admitted that the reason they had bad trade was because there were no markets. What he said was, "If you give the people money, you have created your home market." The reason they were searching the world for new markets was because there was not sufficient money distributed in this country to keep home markets busy. There was never enough money distributed under the present economic system to enable the people of any country to buy their own products, for every country was seeking outside trade. Until this system was altered, so that there was enough money distributed in the production of goods to enable the people to buy the goods they made, there were going to be these periods of unemployment. This was what all nations suffered from, and it was due to the irrational economic system under which they were living. The increase of debt went hand in hand with the increasing value of money. Debt inflation was the inevitable result of deflation of the currency. They had been told that France did not balance her budget; but this was because she had undertaken the rebuilding of the whole of Northern France, which Germany had contracted to do, but had not done. Abolish the mints, and then see what the value of the gold would be. Gold was merely an instrument by which money was valued. Whatever the law said was legal tender, that was what the people must have. Whatever the Government said was money, was money. It had been said that, because he opposed deflation, he was in favour of inflation. He had never advocated such a thing; but of the two evils, inflation undoubtedly produced the less harm. He advocated that the currency should be stabilized, with neither inflation nor deflation. When was the country's national credit the greatest? He maintained it was when they were producing the most goods, and not when they were producing the least. The production of goods was the basis of credit. In Russia paper money would never have lost its value, but that Lenin forbade private enterprise. It did not matter what unit was adopted, so long as it was kept stable. Certainly they should not try to imitate Germany. The unorthodox economist was the man who was going to solve the problem.

VOTES OF THANKS.

The CHAIRMAN proposed a hearty vote of thanks to Mr. Kitson and to Mr. Larkworthy. He was not going to argue the subject with which Mr Kitson had been dealing. He would merely say that, as a social worker, he would be glad if a remedy could be found for unemployment. He had come across many cases of decent, honest people, where women who were nursing children were not getting food enough, consequent upon unemployment, to nourish the children they were nursing. This was a very serious thing indeed. Mr. Kitson was always a very able advocate of any theory he undertook to expound; and he had been very ready to give the Society the benefit of his information on this particular topic.

Alderman GEORGE CLARK, in seconding the vote of thanks, said it might be that Mr. Kitson had not found many converts, because they were plain business men not versed in the science of economics. But they were interested in trade, and they hoped to find in the address some remedy for unemployment, which they were pleased to see was being reduced very rapidly. They believed a better time was coming. They did not come there depressed, but rather hopeful that trade would increase, and that there would be more employment available for their workpeople and a better state of industry before they met again next year. The address would at any rate give them all something to think about.

Mr. KITSON, in acknowledgment, said he saw a good deal of Mr. Cliff in his work at Stamford. It was perfectly true, as he said, that conditions throughout the country were very serious. This winter was probably going to be the most trying one since the war. Somebody must find a remedy for the present state of things.

Before separating at the close of this successful meeting, the members took tea together.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Factors in the Progress of Young Men.

The Twentieth Annual General Meeting of the Association, and the opening meeting of the new winter session, was held on Saturday, Oct. 21, at the Leeds University. Visitors present were Prof. J. W. Cobb; Mr. J. W. Lee, of the Grassmoor Coking Plant, Chesterfield, Past-President of the Association and of the Coke-Oven Managers' Association; Mr. C. S. Shapley, of Leeds; Mr. F. H. Robinson, of Harrogate, the representative of the Manchester District Institution of Gas Engineers on the Yorkshire Junior Association Council; Mr. J. Demaine, of Ripon, Past-President of the Association; and, as representing the Manchester District Junior Association, Mr. Geo. Dixon (President), of Lancaster, Mr. J. Bridge, of Elland, and Mr. J. Alsop, of Bolton.

ANNUAL REPORT AND ACCOUNTS.

The annual report, submitted by the Hon. Secretary (Mr. F. A. C. Pykett, of Halifax), showed the membership to have increased by nine, being now 152.

The financial statement, presented by the Hon. Treasurer (Mr. C. Roper, of Bradford), indicated a year of successful working on the financial side, with a credit balance of £37 11s. 7d.—a figure highly favourable in view of the fact that only two or three years ago there was a heavy debit balance.

The report and balance-sheet were adopted, on the motion of Mr. F. PEEL (Tyldesley), seconded by Mr. W. BARBER (Halifax).

NEW OFFICERS.

Mr. PETER M'NAB, of Low Moor (the outgoing President), then called upon his successor, Mr. H. L. Bateman, to take the chair—a position to which he attained automatically after a year as Senior Vice-President. He said the Association had done valuable work for the younger men in the Yorkshire gas industry. Many of them owed a great deal to the addresses and works visits they had had under the auspices of the Association. He had worked for it and assisted in its progress from the start, and was glad it was more prosperous now than ever in its history.

Mr. H. L. BATEMAN (Wakefield), accepting the presidency, said they had a very promising session ahead. He had worked pretty closely with Mr. M'Nab during the past session, and had observed that their late President had done his best to forward the interests of the Association.

On the motion of Mr. H. S. BOYES (Harrogate), seconded by Mr. E. GILLETT (Bradford), a vote of thanks was accorded the retiring officers.

Mr. M'NAB, replying, said they were grateful for the thanks, but they were more satisfied to know that their efforts had been rewarded by good attendances and high interest.

Mr. W. Heathcote (Halifax), Junior Vice-President last year, was elected Senior Vice-President, and Mr. E. Gillett (Bradford) appointed Junior Vice-President by a ballot election out of seven nominations. Messrs. S. T. S. Musgrove (Sheffield) and C. R. Ingham (Brighouse) were added to the Council (the latter re-elected on retirement); and Messrs. A. Lister (Yeadon) and A. W. Arnold (Bradford) were appointed Auditors. Mr. C. Roper (Bradford) was re-elected Hon. Treasurer; Mr. F. A. C. Pykett (Halifax) Hon. Secretary, and Mr. H. Wilde (Bradford) Assistant Hon. Secretary.

Mr. J. W. LEE (Grassmoor) voiced the thanks of the Association to the authorities of the Leeds University for the generous facilities afforded every session in the way of rooms for meetings and advice by Prof. Cobb and Prof. Smithells. Both these gentlemen had rendered great service to the members, and always showed the most friendly interest in their work.

Mr. J. BALMFORTH (Bingley) seconded the motion, and it was carried unanimously.

MANCHESTER VISITORS.

The PRESIDENT said he was glad to see several friends present, and he had to offer a welcome particularly to the three representatives of the Manchester District Junior Association.

Mr. GEORGE DIXON said the Manchester visitors felt honoured by the invitation to be present. It was altogether desirable that the Junior Associations of the neighbouring areas should keep in touch with each other.

Mr. BRIDGE and Mr. ALSOP also responded.

AN ENGINEER'S ADVICE TO YOUNG MEN.

Mr. C. S. SHAPLEY (Leeds City Gas Engineer and General Manager) said he had not come to give a technical address. He had been asked by Mr. Bateman to give them a talk on something of interest, and thought that for such an occasion he might hardly do better than chat to them—as one who had been a junior himself—as to little ways which would help them to get forward in the profession. There were some present to whom this talk might be of little value; yet it was quite possible that a few hints to the "triers" from one who had been a "trier" himself, and had managed to "get there," might be welcome. He had followed with much interest for a long time past the reports of the meetings of the Junior Gas Associations (not only the Yorkshire Juniors), and had been glad to note the high tone of the papers given, and particularly gratified to see how many gave their Saturday afternoons in order to increase their knowledge and

to further the cause of the great industry to which they all belonged, thereby setting an excellent example to those who worked under them similarly to further educate themselves.

As juniors, said Mr. Shapley, you should first of all be ambitious, and never sit down to the fact that you have no chance to progress. It is up to you to make your chance, and make it by a strong resolve to fit yourself for the higher positions by hard work, attention to duties, punctuality, tact, civility, and politeness. Remember that you cannot play first fiddle until you can play second fiddle so well that your talent has been recognized. Attention to duties is bound to be recognized in the long run, and it is surprising sometimes how a chance visit of an engineer may often change the whole career of a junior. Attention to duties and failure to notice when the clock has passed knocking-off time, are golden channels to success. A well-known writer (C. W. Howson) says: "A sense of duty is one of the most precious qualities of a manly character." Show your chief you are real triers, and in the end reward comes, and probably leisure as a reward for many past hours of hard graft.

Tact, according to the dictionary, is adroitness in managing the feelings of persons dealt with, which I interpret to mean a careful choice of words combined with restraint of action. This is quite as essential as attention to duties, and is absolutely necessary if you are to move to higher positions. Tact is the control of our less fortunate brothers—the employees. Just remember they are all human beings with souls and minds, and quite a few have a fair share of brains. Treat them as human beings, not as machines; with a kindly word, a smile and with great tolerance, bearing in mind that "life without sentiment is like a picture without light." Endeavour to put yourself in their place. Lead, not drive them; lead by persuasion, force of character, and good precepts.

Punctuality is an important factor. Remember the old saying, "Time and tide wait for no man." Therefore let me remind you of the necessity of this virtue, as one cause of annoyance to the Head is at once removed by your being punctual—and when you are late, don't try to look punctual! Civility costs nothing. Therefore, why not adopt it, as it carries you through many a troublesome time, and the results are cumulative? Listen to no tales nor slander, or, as Tennyson says: "Speak no slander nor listen to it." Always remember that who bears a tale will carry one. Find out what is wrong for yourself, which will mean, if you analyze it, a getting down to detail which is in itself attention to detail—a very golden rule, and a most necessary adjunct to successful management and a closer contact with your works and employees. How many of you have considered what an important man even the syphon pumper is? And he is often an old man. How many of you have followed him round one day? It's only a small thing, but sometimes—nay, very often—saves endless trouble. How many works have a syphon-pumping book which the works manager sees weekly, and in which a record is kept of the dips before and after pumping? Consider its importance. In my own experience, when I was on a works before I came to Leeds, I used to visit the syphon pumper every day. A record of the dips was kept, and seen, and initialled. It was not initialled because I wanted him to see my initials, but because I wanted him to know that his work was of consequence, and that an interest was taken in it. That book, eventually, showed the fact that the syphon was making a great deal too much water, and an examination disclosed that the old man, in his zealous dipping, had gradually dipped a hole in the bottom.

No detail is too small not to warrant your attention; and the mere fact of you examining and initialling such a small thing as the syphon-pumping book indicates to the humble syphon pumper that even his seemingly uninteresting task is of importance, and you have shown him in reality, although in a very small measure, he is a necessary unit in the machinery. You should be able to put every employee under the same category, as nothing is more calculated to induce bad workmanship than for the worker to consider that his work is irksome and unnecessary.

On the other side, I would remind the seniors that they have a duty to the juniors, and all I have said with regard to the juniors' treatment of those under them applies equally to the Chief. He must possess all those attributes which I have previously mentioned—that is, if he is going to have a contented staff. He must gain their confidence, show that he is interested in them, and not keep their noses too tightly to the grindstone. Remember the old adage: "All work and no play," &c. There must be discipline at work, yet it is necessary to remember that young men look upon affairs with a young man's ideas. We who have got to responsible positions have been young ourselves. It is sometimes advisable that one should not "see" it if a ball of paper happens to be kicking about a floor just as one enters unexpectedly. There is a degree to which this kind of thing must be tolerated; it is up to the man in charge to know when it has gone far enough. If the man in charge has the confidence of his workers, they are not likely to go too far.

Under my agreement I am entitled to take two pupils; but I have not availed myself of that privilege, preferring to give a helping hand to those juniors who are under my jurisdiction, who show a real interest in their work and a keen desire to improve their knowledge. Every head of a department ought to make an effort to encourage juniors to attend these important meetings of their professional association, by adopting what had been adopted in Halifax, Bradford, and Leeds—I refer to the paying of reasonable expenses to the juniors, thereby encouraging them to attain greater knowledge, and to make themselves of more use to their own undertaking and to the industry in general.

I am delighted to see that a real move has been made by the Institution of Gas Engineers for the further education and examination of those engaged in the technical work in the gas industry. I welcome this very much indeed, as it is one step towards getting really first-class men into the profession. There is a very great stumbling block to this. I refer to the miserable salaries that in many cases are offered in the advertisements which appear in the Technical Press. Poor salaries are not conducive to obtaining the services of first-class men; and I enjoin all juniors in applying for positions where salaries are not stated, not to underestimate their own worth. Many a well-paid job has been ruined by under-cutting. Bear in mind that the value you place upon yourself is the value that the prospective employer places on you.

Before closing, I should like to say that, if any of the juniors would like to see any plant or apparatus we have in Leeds, it will be a great pleasure to me to arrange for them to have the opportunity of so doing.

DISCUSSION.

The PRESIDENT said they had listened to a very interesting and helpful address. It was nice to have men in responsible positions come to the juniors, and tell them what they really did think about matters and about the prospects of advancement for those who had still to "get there."

Mr. W. HEATHCOTE (Halifax), in moving a vote of thanks to Mr. Shapley, said he must compliment him on his remarks in regard to having no premium pupils. It was very hard for a young man on the works who had no influence behind him to get on, unless he could depend upon the advice and help of his senior, and it was to the credit of the senior who was prepared to give every chance of progress to the young man who was willing to try to improve himself, even if he could not become a premium pupil.

Mr. C. ROPER (Bradford), seconding, said it was a number of years now since the Yorkshire Junior Association first made Mr. Shapley's acquaintance. It was at Neepsend, Sheffield; and Mr. Shapley had laid himself out to make the visit a successful and instructive one. He had been similarly helpful that afternoon, in the kindly and useful advice he had given them.

Prof. COBB said the Yorkshire Juniors were as welcome to hold their meetings at the University as they had always been. From his own experience, he wished to endorse warmly, and with complete confidence, every word of the advice given that afternoon.

Mr. R. M. WEBB (New Wortley, Leeds) associated himself with the vote of thanks. It was a great pleasure to him, as a member of the Association, to pay tribute to the help given to the juniors by his own Chief. It had been his own pleasure, since 1918, to come into practically daily contact with Mr. Shapley, and in no sense had that gentleman failed to carry out the advice which he had just given them. He was a constant help to all who worked with him, and his treatment of those on the works was such that he carried the full trust of the men in every department, and especially that of his departmental managers. He always came on the works with a smile and a readiness to assist. If he criticized, it was constructive criticism, to the benefit of the department as well as of the undertaking.

Mr. LEE and Mr. DIXON also supported the vote of thanks.

Mr. SHAPLEY, in reply, said they must all endeavour to live their life in such a way that when they passed on they might leave the gas industry a little bit better than when they found it. They spent most of their time at work, and they should make their work happy and useful, instead of a treadmill sort of a job. They were selling much cheaper gas in Leeds now than for some time past; and if it was not yet further reduced within twelve months, he would want to know the reason why. Dear gas meant that people turned off the taps. The industry must aim at producing cheap yet efficient gas, both for industrial and home use.

EXPENSES OF ATTENDING MEETINGS.

Arising out of Mr. Shapley's reference to the payment of expenses to juniors attending Association meetings, it was announced by the PRESIDENT that the Bradford, Leeds, and Halifax Corporations now paid these expenses; the Harrogate Gas Company had agreed to do the same; and the Elland-cum-Greetland Gas Company, the Sheffield Gas Company, and the Dewsbury, Blackburn, and Cleckheaton Council gas undertakings paid half the expenses. This was all to the good, and would doubtless do much to encourage juniors to support their Associations and enter still more seriously into study.

PRESENTATION TO THE EX-SECRETARY.

Members and friends then adjourned to the Victory Hotel, Briggate, where a most enjoyable high tea was awaiting them. After the repast there was a smoking-room concert, the arrangement of which had been in the hands chiefly of the Hon. Secretaries (Messrs. Pykett and Wilde). A couple of toasts—in addition to that of the King, which was given with musical honours—were drunk; these being to "Kindred Associations" and to "The President." Mr. W. Heathcote proposed the former, and Mr. Dixon replied. The toast of "The President" was proposed by Mr. C. T. B. Roper.

In the course of the evening, the President handed a handsome oak barometer to Mr. F. Peel, former Hon. Secretary of the Association. The members also gave Mrs. Peel a silver vase of handsome design. Mr. Peel said he appreciated the kindly thought behind the gifts.

Manchester and District Junior Gas Association.—A visit to the Darwen Gas-Works which was arranged for next Saturday has, owing to unforeseen circumstances, had to be postponed *sine die*.

THE BRITISH COMMERCIAL GAS ASSOCIATION.

ELEVENTH ANNUAL CONFERENCE AT BRISTOL.

(*Continued from p.* 234)

WE continue below the report of the Bristol Conference, which took place from Oct. 16 to 18; the business proceedings being held in the lecture theatre of the Museum and Art Gallery. Extreme pressure on our columns has forced us to publish as a serial our report of this successful meeting; and this week it covers the papers and discussions of the Tuesday afternoon.

The members assembled in the Lecture Theatre in the afternoon, when the subject under discussion was "The Gas Industry as a Public Service." Sir GEORGE E. DAVIES (the President) was in the chair.

The PRESIDENT said that those of them who realized the responsibility cast upon them as directors of the gas industry knew that they were called upon to see that this great public utility service was developed in the most efficient and in the most useful manner. From the papers to be considered that afternoon, they would see that the gas industry as a whole was not simply a profit-seeking industry. It desired, of course, that a proper return for its capital should always be forthcoming; but, having received that moderate return to which capital was entitled, it also desired that those in the industry should see that beyond this they were public servants, and had a great responsibility thrown upon them in consequence of the position of monopoly which the law had given them. It was as trustees of the public that they had to realize their responsibility. He called upon Mr. S. E. Halliwell (Secretary and Commercial Manager of the Bristol Gas Company) to read his paper on "The Consumer's Point of View," and incidentally expressed appreciation of Mr. Halliwell's work.

THE GAS INDUSTRY AS A PUBLIC SERVICE.

The Consumer's Point of View.

By S. E. HALLIWELL, Secretary and Commercial Manager to the Bristol Gas Company.

The author said that the duty of securing the real and lasting satisfaction of the consumers, and of impressing that we are earnest and keen in our desire to serve them efficiently, is one which ought to be emphasized and repeatedly brought into prominence at all business conferences of the Association. It must be remembered that thousands of consumers are entirely unfamiliar with the activities and aims of our industry. The splendid work of the "B.C.G.A." during the last ten years has done much to popularize gas supply generally, and it is our clear duty, as individual members, to assist in securing the 100 p.ct. membership. The Executive Committee must not be handicapped by lack of funds, and ought to have the support of the whole of the industry, in order to deal effectively with national propaganda. But, with varying conditions and the special requirements of each district, this is not enough. The headquarter activities must be supplemented by local propaganda to suit local conditions. It is not sufficient to decide policy and details of administration in one's sanctum, without careful consideration of the possible effects in our supply area.

It is interesting to imagine oneself as an ordinary consumer, and view from that standpoint the orthodox official notice, with its frigid terms. It does not give the impression of a business atmosphere, nor does it seem convincing in connection with the sale of a commodity. This procedure would certainly not be adopted by progressive business houses. Clear and attractive phrasing in notices and advertisements would undoubtedly be more effective, as it is imperative that the consumer should readily understand our policy and methods without the necessity of a close study of formal and legal phraseology. Give him the facts in a business-like manner, and tell him why, for he is the man to whom we appeal for interest and support. Our offices and showrooms ought to be centres of education and publicity, appealing to the public as information bureaux and reception departments to which consumers can come, with confidence, for information or advice, and receive the courteous and business-like treatment which they have a right to expect.

We must not overlook the fact that every consumer, large or small, has a sphere of influence for good or evil, so far as our interests are concerned; and, if public confidence has to be secured, it is essential that every official should realize the necessity of exercising tact, adaptability, patience, and even versatility, in dealings with the public. A close study of human nature—a most interesting and profitable study—ought to be an essential part of our training, and a determining qualification; for it is a most valuable asset to any undertaking to have officials who can carry out their business dealings without creating unnecessary irritations and misunderstandings. Officials in regular contact with the public should be constantly reminded that they are dealing with the units who form public opinion; and if an atmosphere of dissatisfaction is created by maladroit officialism and fostered by a spirit of indifference and isolation, no wonder that, in times of vigorous attacks on the industry by pressmen with vivid imaginations, certain sections of the public, who may have unpleasant recollections of experiences with their supply companies, are impressed with the so-called agitation, without the least consideration of the real facts of the case. We have a commodity for sale which we consider the best for the purpose it serves; yet it is not the only thing available, and a time might come when hosts of satisfied, trustful, and friendly consumers throughout the country would be a powerful stand-by to all of us whose interests are bound-up with the sale of gas.

Get the consumer's point of view in regard to your gas service generally, and you realize the direction in which lies scope for energy and enterprise. The prompt and effective attention to, and even the encouragement of, complaints is good business, and impresses the consumer, for efficient supply is our most powerful argument. Absence of public agitation and low complaint returns do not necessarily mean efficient supply. The author said he agrees with Mr. H. E. Bloor, of York, when, in his Bradford conference paper in April last, he expressed the opinion that it is quite possible that there may be a large number of persons who regard a certain amount of inefficiency as inevitable in gas supply, and, as a consequence, do not promptly notify the undertaking. This is a strong argument in support of the need for educating the consumer to the standard of efficiency that can be attained by modern gas appliances with suitable connections and fittings. It is obvious that this type of consumer is more readily impressed with competitive means of lighting and heating, if he does not realize the possibilities of his existing system. Complete maintenance schemes on liberal lines, with comprehensive inspection campaigns, are obviously the only means to ensure efficiency and satisfaction.

A regular advocacy of economy in the use of gas, with instructions to inspectors to point out to consumers the efficient way to limit their consumption to their exact needs, and how to obtain full value from their gas supply at the lowest possible cost, inspires confidence. Waste of gas means unnecessary complaints and scathing criticisms about the supposed lying propensities of the long-suffering meter. It results in a great amount of investigation work, and the public should be constantly reminded that our one aim is to secure satisfied consumers—those who use gas economically and intelligently. Consumers with what the Americans style a "Thrift" bill are our most valuable allies, and an educative campaign to urge the public to cultivate the habit of ordinary care would be a paying proposition to all concerned. To impress them that we are not out to sell gas alone, but to provide "Gas Service," means better relationship. Up-to-date manufacturing plant and the development of scientific methods of production and distribution are not enough in themselves to ensure success; but with a combination of all the departmental forces, and the commercial mind determined and alert to secure and maintain public confidence by all legitimate means, there must necessarily result further rapid progress and success of the industry of which we are so justifiably proud, because of the part it plays, and the influence it exerts, in the national and domestic life of our country.

DISCUSSION.

Mr. H. E. BLOOR (York) said he was glad to have an opportunity of giving further information on the experiment of which he had given details at the Bradford meeting. At York, they had instituted a scheme whereby men specially trained for the work went from house to house, not in response to complaints, but simply with the object of ascertaining by personal examination to what extent the conditions ruling in the households of York were such as the gas undertaking could regard as satisfactory. The men went round and asked if there were any complaints to be made with regard to the gas, and, to a very large degree, so gained the confidence of the householders. He was now able to give the figures for the examination of the whole of York proper, excluding the outside district. There were 18,732 examinations made, which included ordinary and shop consumers. In 19·6 p.ct. of the cases one or more defective gas lighting burners were found. This was not the number of burners found, but the number of installations in which one or more burners were found which required attention. As to gas-fires, &c., in 14·1 p.ct. of the cases the inspector found one which had to be adjusted or altered. In 1·9 p.ct. of the cases—he was a little gratified at this figure, although he was afraid it sounded less than the actual number—the service pipe was too small. In 2·5 p.ct. of the cases there were found escapes of gas sufficiently serious to necessitate a fitter repairing them; and in 1 7 p.ct. of the cases there were defective gas-taps. Taking the whole examination, and putting aside for the moment the possibility of there being more than one of these types of complaint in one house, in 39 8 p.ct. of the premises examined something was found defective. Coming to the subject-matter of the paper, the question of service to the community was, of course, one

upon which they were all very keen. But he believed that those in the gas industry considered that they were somewhat under a cloud at the moment. The attack on the therm was unpleasant. He could not help thinking what a pity it was if, simultaneously with the introduction of the therm, there had to be an increase in the price of gas. There were very many places where the introduction of the therm did coincide with an increase in the price of gas; and this was a great handicap for the therm to contend with.

Mr. E. UPTON (Liverpool) said that Mr. Halliwell had mentioned that they should create an atmosphere of confidence and satisfaction among their consumers. This was a first essential. Not only must they create this atmosphere of confidence, however, but once they had got it, they must retain it. The essentials were promptness, courtesy, accuracy, and fairness. They should never make a promise to a consumer unless they were absolutely sure that they were going to carry it out; and they were very particular about that in Liverpool. With regard to the suggestion in the paper that the mechanism of the gas undertaking should be taken apart and the pieces spread out for the consumer to handle and understand, he doubted very much whether the consumer would understand it. Personally, he would like to see more of the public admitted to gas-works, in order that they could see the difficulties to be faced, and that the ideas of the consumers and the gas undertakers could be brought into closer touch.

Mr. J. W. M'LUSKY (Glasgow) was struck by the fact that Mr. Halliwell had been doing private detective work in Bristol. They did not require to do this in Glasgow, where they were kept daily in touch with the conditions in every part—they knew what was taking place at certain hours of the day. Information from the consumers was very welcome to the gas undertaking in Glasgow, and that information often agreed with the reports which came in from the various districts. As to complaints, no matter where one went, it was not the appliances under the control of the gas undertaking which were the cause, but those which had been purchased by the consumers. It was found in Glasgow that where they had electrically-lighted houses, they did not hear anything from the people occupying them. It was not because they were not suffering from electricity, but because they had an ample allowance of gas for heating and cooking. Their best area, where the average consumption was 70,000 c.ft. per annum, was electrically-lighted; and there was hardly any correspondence from that place. The districts which were troublesome were those containing small, old-fashioned houses, with small pipes and a bad service inside. He was more convinced than ever that unless they followed the gas right through to the burner they would not get satisfaction in these districts. In Glasgow, they had started inspecting houses, and were blazing a trail through a district where there had been complaints; but there were no complaints following them up. So far as he knew, the figures were very much the same as Mr. Bloor's. They were trying to get the maintenance figure down to 1d. per 1000 c.ft. sold. It could be done at this figure, and done well. He asked what the Association could do to put some restraint on trashy fittings.

The PRESIDENT suggested that it must be somewhat refreshing to those who were not gas officials to hear the representatives from four principal gas undertakings in Great Britain saying that they welcomed complaints on the part of the consumers if they considered that anything was wrong. This ought to give the consumers confidence that there was a desire on the part of officials and directors of the industry to play their part as members of a public service.

The papers by Mr. W. N. WESTLAKE (Engineer and Manager of the Exeter Gas Light & Coke Co.) on "Gas as a Domestic Servant," and by Mr. P. S. HOYTE (Engineer of the Plymouth and Stonehouse Gas Light & Coke Co.) on "Some All-Gas Houses," were then read by the authors.

Gas as a Domestic Servant.

By W. N. WESTLAKE, Engineer and Manager of the Exeter Gas Light and Coke Company.

In indicating how gas can be regarded as a domestic servant, Mr. Westlake referred to the necessity for bettering the conditions which have played at least some part in driving women from domestic service to other kinds of work. Any solution that is to be really effective must be hygienic, economical, and generally available. There are many aids, but the one big remedy is that one which will do away with the burning of 30 million tons of raw coal annually, in domestic ranges and grates. The only practical method, which has stood the test of experience, and is being rapidly adopted, is the use of gas for cooking and heating, supplemented, in suitable cases, by coke. Speaking generally, if gas, supplemented by coke where found advisable, is used in the home instead of raw coal, the labour of the household is reduced immensely.

The consumer always controls the amount of his gas bill, not the gas undertaking. The methodical consumer will watch the quantity he consumes week by week, and read his meter regularly. Gas, properly used and controlled, is not an expensive fuel when all the advantages it confers are reckoned to its credit. It must not be forgotten, moreover, that all gas undertakings are vitally interested in the economical use of gas, and are always ready to offer consumers every assistance in this direction. Extravagance is their enemy, not their friend. Gas undertakings, owing to parliamentary control, are a special class of commercial concerns. They do not exist to make large profits. It is true they must earn enough to pay a reasonable interest on money they have had lent them by the public to carry on the business; but beyond this it is their interest, as well as their aim, to give an efficient and cheap gas supply, and to serve the public to the utmost of their ability.

The author gave illustrations of some excellent installations of cookers, fires, and water-heaters, and concluded by saying it should be a gratifying thought that there is available a solution for the housewife's troubles. Gas is an automatic servant, clean and reliable, always on duty, never wasteful—surely a model servant to possess.

Some All-Gas Houses.

By P. S. HOYTE, Assoc.M.Inst.Mech.E., Engineer to the Plymouth and Stonehouse Gas Light and Coke Company.

It was remarked by the author that the sum of human effort employed in handling the solid fuel supply to the homes in this country is, and must be, staggering, and this is in no way diminished by the adoption of so-called "smokeless fuels." While in no way seeking to deprecate the efforts of those who are seeking by this means to rid us of the intolerable smoke nuisance, surely in gaseous fuel we have a far more excellent way. What advantages, after all the talking and research, has "smokeless" fuel over coal, except just the fact that it is smokeless? The amount of human effort required in the home, from its arrival in the coal-cellar to the ultimate deposit of the refuse in the dust-bin, *via* innumerable journeys up and down countless miles of stairs in little scuttles—a few pounds at a time—is just as much in the one case as the other. Gas, on the other hand, delivered at the very point where it is required, needs no effort beyond the turning of a tap; and it is safe to say that the housewife with a gas-cooker and other gas appliances enjoys at least half-an-hour's more rest every morning of the year than the one who has to rise and wrestle daily with a coal-range.

It was with these considerations in view, and to demonstrate them in a practical way, that the Chairman of the Plymouth Gas Company, Mr. J. H. Ellis, recently erected on the outskirts of the district two semi-detached houses of the bungalow type, equipped throughout with gas for heating, lighting, and cooking. Needless to say, they speedily passed from his hands, and each is now occupied by a family of three or four persons. The houses were designed by Mr. J. Leighton Fouracre; and in addition to plans and photographs, the following particulars were given in the paper.

Particulars of Gas Installation at Pomphlett Cottages.

Living room, 18 ft. by 12 ft.
- 10 in. gas-fire (no boiling-burner).
- Two-light inverted pendant and burners.

Large bedroom, 14 ft. by 12 ft.
- 8½ in. gas-fire with boiling-burner.
- Two inverted brackets and burners (provision made in ceiling for centre light if tenants wish to use room as drawing room).

Second bedroom, 12 ft. by 10 ft. 6 in.
- 8½ in. gas-fire (no boiling-burner).
- One bracket and inverted burner.

Third bedroom, 10 ft. 6 in. by 8 ft. 9 in.
- One bracket and inverted burner.

Scullery, 10 ft. 9 in. by 8 ft. 9 in.
- Cooker with plate rack, splasher, and hood.
- 10-gallon wash-boiler with tee and branch fitted to deliver into tip-up bath. To fill boiler, casting drilled and pipe inserted with stop tap above to avoid splashing.
- One inverted bracket and burner.

The consumption of gas for the first complete twelve months is now available, and amounts in the one case to 60,000 c.ft. and in the other to 49,700 c.ft.—say, an average of 55,000 c.ft. per annum, which at the present price in the district of 3s. 10·8d. per 1000 c.ft., or 10·4d. per therm, amounts to £10 14s. 6d. per annum. For this modest average sum, each of these families has obtained the whole of its light, warmth, cooking, baths, washing, and ironing.

DISCUSSION.

Mr. A. W. SMITH (Birmingham) said he had been most interested in the experiment Mr. Hoyte had described. When they went to Birmingham next year, they would find they had very many all-gas houses in the Birmingham area of supply, and had had for some years past. During the war a large estate was erected by a firm there, comprising some 250 to 300 houses, some of which were brick built, and others were wooden bungalows. The wooden bungalows were heated by gas, with the exception of coke central-heating plant and coke-boiler; and they were finding that the users of coke—they also tried to press coke upon their consumers occasionally—were asking the gas undertaking to instal gas-fires, because they had got so used to the convenience of the gas-fire and the gas-heated apparatus that they did not want any solid fuel in the rest of the house, if they could avoid it. This was the ideal they all had before them, and hoped to attain; but as to how far it was practicable at the present time, would depend on the circumstances in the different areas. The Housing Committee of Birmingham had agreed to fit up, and had already fitted up, about 2000 of the municipal houses with gas points in every room—with the exception of one living room, he believed. They would not put in gas-grates in the parlour and the bedrooms, because they apparently took the same view as the Smoke Abatement Committee—that the Englishman was not yet ready for all gaseous fuel. There was no doubt that the previous experience would be repeated, and that the gas undertaking would be called upon to put in gas-fires where they were not adopted by the Housing Committee. No electricity had been installed in the houses covered by the housing scheme. The Housing Committee had gone into the matter very impartially and very carefully.

Finally the Ministry of Health had considered it; and it had been decided that the residences should be gas-equipped.

Mr. GEORGE CLARRY (Cardiff) also impressed upon the visitors that the members of the Association would be glad to go away with any ideas they might put forward. Referring to the drudgery of the household, he said it was the motto of the industry that they should endeavour to cut that down to a minimum; and it was for this purpose that they sent out their men to investigate complaints, and tried in every possible way to give satisfaction.

Mr. P. G. PAWSON noticed that Mr. Hoyte had installed a 10-in. gas-fire in a room 18 ft. by 12 ft.; and he would be interested to know if it had been found that this size of fire efficiently heated the room.

Mr. HOYTE said that Plymouth was very far west, and they rarely got acutely cold weather, such as they might suffer further north; also, last winter was a mild one. They had only had twelve months' consumption; and so far as he was aware, the fire had been large enough to heat the room. It was possible, however, that it might be desirable further north to instal a larger fire for a room of that size.

Mr. F. W. GOODENOUGH (Executive Chairman) said he was sure that gas managers particularly wished to emphasize everything that Mr. Halliwell had said about satisfying the public and securing their confidence, and especially in regard to seeking to obtain knowledge of their complaints in every possible way. He remembered some years ago his own Company had instituted a system of writing to consumers a month after every installation of gas apparatus, asking whether everything was satisfactory. A member of his staff had said to him that this was asking for complaints; but he had replied that this was exactly what he wanted to do. If there were complaints, the Company wanted to know of them. His Company had offered every doctor in the district that if he had gas-fires in use, they would overhaul them to see that they were in working order. If he had not got gas-fires, they would put one in on trial; and if he did not like it, they would take it out again. They had fixed 10,000 gas-fires on the terms of that offer, and had never taken one out again. They had examined any number of gas appliances in use by doctors at that time, and more shocking, wasteful, stinking, unsatisfactory apparatus than they had found in the houses of some of the doctors in the district they would hardly have credited if it had not been their actual experience. If medical men would put up with the sort of stuff they were tolerating in those days, what might not the ordinary lay consumer put up with, if the gas industry did not take steps to find it out? The story which had been quoted that morning—of the doctor who had written to say why not go back to the old method of charging, because his eggs were hard boiled—was really typical of the knowledge the average doctor had, apparently, of gas apparatus ten or twelve years ago. His Company had broken that down in regard to medical men in London; and over 80 p.ct. of the doctors in Harley Street used gas-fires exclusively. They had no better customers than the medical men. Of course, when they put in a large number of gas-fires in a house, it might be found that the cost of heating the house was pretty considerable. But they must always take the balance-sheet as a whole; and he mentioned a case in his district which was illustrative of that. There was a nursing home where he had found gas-fires in every room. It was used by some of the most eminent surgeons in London, and gas was employed for cooking and for heating water. He (Mr. Goodenough) told the matron he was pleased that gas was used, and asked if it were satisfactory. She had replied that it was satisfactory, but that it cost a lot of money. He had suggested that there was a saving in labour costs, and the matron had said they had got rid of one of the maids since gas was installed. The gas account did not amount to more than £60 per annum; and he had pointed out that the gas did not cost anything, because the servant would have cost £60 in labour and keep. Later the matron wrote a letter, which was useful as a testimonial. This pointed the moral that they must take all factors into account when reckoning gas costs. The public had to realize that there was no domestic commodity in respect of which the consumer was better protected, both in regard to quality and price, than gas. The quality was strictly controlled and constantly checked; the price was controlled, because dividends could not be increased without the price being reduced; and the only thing not controlled by the gas undertaking was the quantity used.

Mr. A. B. ROXBURGH (Newcastle-on-Tyne) said he would like to add his meed of appreciation, particularly of Mr. Halliwell's paper. The keynote of it, of course, was service; and he trusted that the proposition he was about to make would not be considered irrelevant. At the meeting of the "B.C.G.A." at Manchester, soon after its inception, an American gentleman named Sheldon was introduced, and made some amazing speeches. As a result, many people engaged in the gas industry studied what was known as the Sheldon system of business building; and he (Mr. Roxburgh) considered it was a perfectly relevant suggestion that, after so much time had elapsed—he believed it was ten years—it would be a good thing if the younger generation had an opportunity of studying something drawn-up in the same form. He did not believe that the Sheldon scheme was in existence at present. This system enabled them to organize their forces in order to produce better work. He threw it out as a suggestion that they should consider very carefully the production of something on the lines of Sheldon's scheme for the use particularly of junior salesmen in the gas industry. Several remarks had been made regarding the quality of the products offered for sale to the gas-consuming public. The products were merely sold, from the manufacturers' point of view, in order to get rid of them. He believed that this rested largely in the hands of the gas authorities. The plumber or shopkeeper selling gas apparatus must be encouraged to increase the use of gas; and this could be achieved with some little trouble. His Company had experienced a great deal of antagonism some years ago from what they called the trade—*i.e.*, the plumbing trade. In the North of England the plumber does the gas-fitting work. Of course, it might be more important to the plumber to push his hot-water work, &c.; but gas-fitting was no mean portion of his business. It was not a difficult matter, with patience, courtesy, and, above all, perseverance, to bring the trade into line with the industry, because a gas company or authority, on account of its size and purchasing power, could purchase gas-fittings at a lower rate than the trade could purchase them. The gas undertaking in Newcastle were, to a large extent, factors in gas apparatus for the trade of the district. The trade could get from the gas undertaking the same discounts as they could get by buying direct from the manufacturers; and they were going to the undertaking for nine-tenths of the things they required. After all, what a gas undertaking needed was gas consumption; and the temporary profit obtained on a small piece of apparatus did not matter. What did matter was permanent consumption; the day of gas lighting was not dead by a long way. Before his undertaking had started the scheme, they had invited the members of the Master Plumbers' Association to the showrooms, and addressed them, and asked for their co-operation and help, with the result that in 14 days they had got rid of 1116 lighting burners—in all, they had sold 2202 pieces of gas-consuming apparatus. The total sales amounted to £1114, a considerable portion of which was for the plumbing trade.

Mr. D. C. PARFITT (Secretary of the Master Plumbers' and Domestic Engineers' Association, Bristol) said that the trade generally was most anxious and willing to help the gas companies throughout the country; and it was up to all the gas companies to recognize the plumber and the gas-fitter. The local plumbers' association had tried in every way to co-operate. From a national standpoint, he believed it would be found that the National Institute of Plumbers, if only the gas companies got into touch with it, would be a valuable asset.

Alderman J. H. WADDINGTON (Chairman of the Halifax Corporation Gas Committee) said that since he had become Chairman of the Gas Committee at Halifax, he had been advocating the use of gas among his friends; but the great bone of contention was the rendering of accounts. If any of them persuaded a friend to put in one or two gas cookers and fires, the trouble arose when the question of the gas account was raised. This was a very serious problem. Gas undertakings would have to render their accounts more frequently, far more frequently than at present. Four times a year was not enough; they should be rendered once a month. He was sure they would solve the problem of developing the use of gas apparatus in houses if they gave shorter credit. The drawback was not with the department, but with the controlling financial authority; and it would be worth while to press for the rendering of accounts monthly.

The next paper presented dealt with

Gas Service in Seaside and Other Health Resorts.

By P. G. G. MOON, Engineer and General Manager of the Bournemouth Gas and Water Company.

In the opening paragraphs of his lengthy and plentifully illustrated paper, Mr. Moon said it is common knowledge to everyone that gas plays an important part in any community, but it possesses certain advantages which make it particularly adaptable to the exigencies of seaside towns—that is, to towns which specially lay themselves out to cater for large numbers of visitors. Given the natural amenities which are desirable for any popular seaside pleasure resort, all such towns have many things in common.

In the nature of things, there are large numbers of hotels, boarding houses, and apartment houses, there are restaurants and tea rooms, places of entertainment, laundries, and mineral water factories—all existing for the purpose of catering for large crowds of visitors, and crowds, moreover, which vary in numbers from day to day. Now the wise caterer, whether he be hotel, restaurant, tea-room, or cinema proprietor, wants to give the most efficient service in the quickest time, with the least possible dislocation of his staff. In other words, he wants the most flexible service obtainable. Whatever may be the opinion of hotel and restaurant proprietors in other health resorts, it is certain that the majority of those in Bournemouth believe that they have found the most flexible service in gas. This is evidenced by the large number of hotels, boarding houses, restaurants, and business houses in Bournemouth which do the whole of their cooking and catering by means of gas, while of the others it is probably safe to say that there is not one which has not in use a fair proportion of gas apparatus of one sort or another.

Theoretical consideration and academic truths have a certain interest, but they only receive weight and acceptance when they are endorsed and adopted by practical business men who have to justify their faith through their annual balance-sheets. Judged in this way—by the searching school of experience—gas emerges from the test with an excellent record. A very large number of cases, in Bournemouth alone, could be given in detail of hotels, boarding houses, and restaurants where the whole of the cooking is done by gas, of cinemas and hotels generating their electricity by means of gas-engines, of laundries using gas for power and for ironing, and of hotels and boarding houses using gas-fires for their bedrooms. In the limited time available, however, it must suffice to give a detailed account of a few typical examples only of these various installations.

HOTELS.

The Carlton, East Cliff, Bournemouth.

The Carlton Hotel gas kitchen is probably as good an example as can be given of many similar hotel installations. This installation was fitted in 1904, and was extended and re-modelled in 1919. The kitchen contains:

One 7 ft. boiling table in tiled recess.
One 5 ft. "Mansion House" roasting oven.
One 2 ft. griller with oven.
One 4 ft. boiling-table.
One gas-heated steamer.

In addition to the kitchen there is a still room, which contains:

One Still's gas-boiler, complete with coffee machine and milk urns.
One 18 in. gas-toaster.
Two 5 ft. gas hot-closets with carving tables.

The total cost of the installation fixed complete, including the 1919 overhauling and additions, was just over £350. The gas consumption* is approximately 2¼ million c.ft., or 10,125 therms, per annum, which covers the whole of the cooking for 100 visitors and the hotel staff.

Hawthorns Hotel.

The Hawthorns Hotel is another large hotel where the bulk of the cooking is done by gas, though in this case a certain amount of steam-heated apparatus for the cooking of vegetables, &c., is used. The gas apparatus in use in this kitchen is as follows:

One 6 ft. gas-oven.
One 3-shelf "Portway" gas-oven for pastry.
One 25 gallon gas copper.
One 8½ ft. gas-heated boiling-table.
Two 24 in. gas-grillers.
One 5 ft. gas-heated plate warmer.

The annual consumption for this hotel is 1,695,000 c.ft., equivalent to 7627 therms, and cooking is done for about 300 visitors and staff.

Boarding Houses.

There are, of course, a large number of boarding houses in every health resort, and these vary in character from those which are very little removed from the regulation hotel of quite considerable size to the smaller boarding houses accommodating from 20 to 40 visitors. For such establishments gas is practically invaluable for cooking—especially having regard to the acuteness of the servant problem and the almost equally acute difficulty that obtains in so many of these houses of providing adequate kitchen accommodation. That this is appreciated by the proprietors is proved by the very large number of gas kitchens that have been installed in these establishments throughout Bournemouth. It would be possible to give a very long list of such installations; but such a list would be merely tedious, and would serve no useful purpose, since well over 90 p.ct. of all the boarding houses in the district rely practically entirely upon gas for cooking.

Wimbledon Hall.

As a typical example of an installation of the larger kind, particulars of that in use at Wimbledon Hall, Derby Road, may be given.

The kitchen contains:

One 6 ft. treble oven gas-range, with boiling-table on top.
One 6 ft. gas boiling-table.

The still room is fitted with:

One Stott's boiler for tea making.
One 18 in. gas-toaster.
One 6 ft. gas hot-closet and carving table.

Cooking is carried out in this kitchen for about 90 visitors and staff.

Twelve months' gas consumption for kitchen purposes amounts to 1,367,000 c.ft., or 6151 therms.

Suggestions for Standard Arrangements of Cooking Apparatus.

For the guidance of those wishing to instal a complete gas kitchen for hotel or boarding house purposes, the following are suggested as standard arrangements based on the experience acquired from time to time in the equipment of a large number of such establishments. These arrangements can be modified to suit the special requirements of the hotel proprietor or chef.

1.—*Arrangement of Gas Cooking Installation suitable for cooking for 80 to 100 visitors and staff.*

One 6 ft. gas boiling-table.
One 30 in. gas-oven.
One 36 in. ditto.
One 24 in. gas griller and toaster.
One coke-boiler for hot water.
One gas-heated steam closet for puddings, meats, and vegetables.
One 12 in. Still's gas-heated boiler for hot water.
One 6 ft. gas-heated hot closet and carving table.

Approximate cost, including fixing, £270.

2.—*Arrangement of Gas Cooking Installation suitable for 30 to 50 visitors and staff.*

One 4 ft. gas boiling-table.
Two 23 in. gas-ovens fitted one above the other.
One 18 in. gas griller and toaster.
One gas circulator boiler for hot water, fitted in conjunction with an independent coke-boiler.
One Still's gas-heated boiler for hot water for tea-making, &c.
One 4 ft. gas-heated hot closet and carving table.

Approximate cost, including fixing, £190.

Apparatus at Gas Companies' Showrooms.

It is very desirable, in order to facilitate the quick execution of orders, and to have actual apparatus for hotel and boarding house proprietors to see, that companies should keep a certain amount of the larger type of gas cooking apparatus always on hand. This has been found to be much more satisfactory than trying to effect sales from a maker's catalogue, however excellently it may be illustrated. The following apparatus is suggested as a suitable nucleus stock:

One each 4 ft. and 6 ft. boiling-tables.
One each 3 ft. and 3 ft. 6 in. gas ovens without hotplate.
One each 18 in., 24 in., and 30 in. grillers and toasters on stands.
One steaming closet for cooking vegetables, puddings, poultry, &c.
One "Portway" gas-oven for cakes, pastry, &c.
One each 4 ft. and 6 ft. hot closets with carving tables with water-jacketed tops.
A sample of each of the leading makes of water-boiling apparatus, suitable for direct brewing of tea.

Comparative Cost of Hotel Cooking by Gas and by Coal.

It is difficult to give any very definite figures with regard to the comparative cost of cooking by gas and by coal. If the cost of fuel alone is considered, there is no doubt that coal comes out cheaper than gas. A comparison based on "fuel cost" alone would, however, be very incomplete and misleading. It takes no account of the saving, in labour, time, and dirt, which gas cooking ensures, neither does it give any credit for the flexibility of service, which is so valuable an asset in the hotel kitchen; and it is, moreover, very difficult to translate these advantages into money in any positive way.

From data obtained from a number of hotels cooking either entirely by gas or entirely by coal, the following rough comparison may be given, based on an average cooking load of 100 people:

Gas Cooking.

Annual gas consumption.	
2¼ million c.ft. at (say) 4s. per 1000 c.ft.	£450

Coal Cooking.

Coal for kitchen	98 tons	
Coal for hot water supply for washing-up, and cooking	36 tons	
Total	134 tons	
at (say) £2 10s. per ton		£335
One man and one boy extra, due to cartage of coal and ashes and extra work in kitchen and stokehole, at £3 per week		£156
		£491

From these figures there is obviously very little in it one way or the other, if cost alone is considered; but if the contingent advantages of gas, which have already been mentioned, are taken into account, the balance undoubtedly comes down heavily in favour of gas.

Restaurants and Tea Rooms.

The restaurants and tea rooms, of which there are many in Bournemouth, almost all of them of a high-class character, are practically without exception fitted throughout with gas apparatus.

Criterion Restaurant.

The Criterion Restaurant is fitted with the following:

One Richmond's "Coaster" cooker with large oven.
One 24 in. toaster with hot closet.
One gas-heated steamer.
One 5 ft. hot closet and carving table.

Gas consumption for the year June, 1921, to June, 1922—629,200 c.ft. = 2831 therms.

This kitchen cooks for about 80 to 100 luncheons.

Plummer, Roddis, Ltd.

This firm own a large departmental store, and in connection therewith run one of the larger of the popular Bournemouth tea rooms.

The kitchen contains:

One 6 ft. gas-heated boiling-table with 2 ft. 6 in. gas-oven.
One 5 ft. double oven gas-range.
One gas-heated stock-pot stand.
One 3 ft. gas boiling-table.

The still room contains:

One 5 ft. gas-heated hot closet.
One 2 ft. gas-heated "Bain Marie."
Two 3 ft. 6 in. gas-heated toasters.
One Jackson boiler } for tea making.
One Still's gas-boiler }
One 2 ft. gas hotplate.

The bakery contains:

One 5 tier "Portway" gas-heated pastry oven.

The kitchen cooks for about 70 to 80 persons for luncheon and about 60 staff of their drapery establishment. The still room serves about 700 people for tea daily. The Portway gas-oven bakes all the large and fancy cakes and pastries for the tea rooms and for sale. The output is approximately 750 to 1000 fancy cakes and pastries, and 500 to 750 buns, scones, and rolls daily.

Gas consumption per annum at this establishment is 1,122,800 c.ft. = 5052 therms.

Bobby & Co.

This firm are one of the largest of the Bournemouth drapery and ladies' outfitting establishments, and, like Messrs. Plummer,

* In considering the gas consumptions throughout this paper, it should be remembered that Bournemouth has an "all the year round" season.

Roddis, Ltd., run an extensive and very popular tea lounge. On the average they serve approximately 2000 teas per day, and their still room contains the following gas apparatus:

Four Jackson gas-heated water boiling apparatus.
One gas-heated milk urn.
One gas-heated coffee urn.
One 3 ft. gas-toaster.
One 2 ft. gas-toaster.

The annual consumption of gas for this still room for the year June, 1921, to June, 1922, was 918,900 c.ft. = 4135 therms.

Altogether there are in the centre of Bournemouth fifteen large restaurants and tea rooms where luncheons and teas are served, all the cooking being done with gas, and most of them doing all their own cake making in gas-ovens. In addition to these there are, of course, a very large number of restaurants and tea rooms in Bournemouth and the towns near it along the coast, most of which are also completely fitted-up with gas apparatus.

Bournemouth Corporation Undercliff Drive, Beach Promenades, and Piers.

The Bournemouth Corporation own the whole of the foreshore rights for several miles on either side of Bournemouth Pier, and they have wisely provided catering facilities at various points to meet the needs of visitors. There are in all eight cafés where luncheons and teas are served all the year round to a very large number of people.

The kitchens are mostly fitted as follows:

One 4 ft. gas boiling-table.
Two gas-ovens, one above the other to economize space.
One 2 ft. gas-heated toaster.
Two Richmond's Solus gas water-heaters for tea making.
One gas-heated milk urn.
One gas-heated coffee urn.
One No. 20 Potterton "Victor" gas-boiler for hot water.

The turnover in six of these cafés last year (two having been added since) was over £25,000, and the total cost of supplying and fixing the various gas installations was approximately £1200.

As an indication of the volume and character of the business done and the gas used in these cafés, detailed particulars are given of one of them.

West Beach Café.

Average number of teas served daily	. . . . .	1500
" " luncheons	. . . . .	250
" " coffees	. . . . .	600

The gas used from June, 1921, to June, 1922, was 419,600 c.ft., equivalent to 1888 therms.

In addition to the catering facilities provided on the sea front, the Bournemouth Corporation have fitted up small gas kitchens and still or service rooms at the golf links, clubs, cricket pavilions, and winter gardens, where light luncheons, teas, &c., are served.

Ready-Cooked Food.

In most seaside resorts there are a large number of visitors who find accommodation in the smaller houses, and a certain proportion of such visitors undertake their own catering. These people buy a considerable amount of their food ready cooked from shops of various kinds—such as ham and beef shops and fried fish shops These shops are more and more turning to gas for their source of heat, largely on account of its freedom from dirt, its readiness for instant use, and its ease of adjustment. To-day most of the existing fish-frying apparatus is being converted to gas heating, or new gas-heated friers are being installed. With a typical fish-frying installation fitted in a Bournemouth shop, a test was taken of the gas consumed for one evening's cooking, with the following result:

Quantity of fish fried	1 cwt.
" " chip potatoes fried	2 cwt.
Gas consumption 850 c.ft., or 3·825 therms, at 10·4d. per therm	3s. 3½d.

The coal-heated frier which this apparatus displaced would have used 1¼ cwt. of coal, costing 3s. By employing the gas-heated frier, the actual saving in oil for frying purposes was 1 gallon, costing 6s. 6d., so that the net saving effected was 6s. 2½d., irrespective of the saving of labour, &c.

Institutions, Schools, &c.

In a health resort such as Bournemouth there are naturally a large number of boarding schools and institutions of various kinds. In these gas has been largely recognized as affording the most convenient means of cooking and heating.

Bournemouth Collegiate School.

The kitchen contains:

Four large single oven gas-cookers.
One 30 in. gas-heated griller and toaster.

This installation cooks for about 160 pupils daily.

Gas consumption for the twelve months for the cooking apparatus amounts to 862,000 c.ft. = 3883 therms.

Royal National Sanatorium.

The Royal National Sanatorium at Bournemouth usually has from 90 to 100 patients and a staff of about 30.

The whole of the cooking is done with gas, the consumption of which for the year June, 1921, to June, 1922, was 1,122,000 c.ft. = 5049 therms.

The apparatus installed in the Royal National Sanatorium kitchen is as follows:

Four large Richmond gas-ovens.
One 7 ft. gas-heated boiling-table.
One 6-gallon Richmond gas-heated multi-tubular boiler for tea making.
One 20-gallon gas-heated multi-sterilizer.
Two 10-gallon gas-heated water-jacketed coppers for porridge making, &c.

Scullery:

One 4 ft. gas-heated boiling-table for vegetable cooking.

Hospitals.

The Royal Victoria and West Hants Hospital, Boscombe.

The wing of the above hospital in which the kitchen is situated was built some ten years ago. When the plans were under discussion, the Management Committee decided after very careful consideration to do all the cooking by gas.

The kitchen is fitted with:

One 8 ft. gas-heated boiling-table.
One 36 in. Richmond gas-oven.
One 30 in. ditto.
Two 16 in. Richmond gas-ovens.
One 24 in. gas-heated griller and toaster.
One 6-gallon multi-tubular gas-boiler.
One 6 ft. hot closet and carving table.
Two water-jacketed gas-heated porridge boilers.

Scullery:

Two gas-heated steaming closets for cooking vegetables, poultry, &c.

Each ward has its own ward kitchen for the preparation of special foods; and these are all fitted with gas-cookers and with gas-heated sterilizing apparatus.

Gas consumption for the last twelve months was 2,934,000 c.ft. = 13,203 therms.

There are two other hospitals in the district, both using gas entirely for cooking.

Royal Victoria Hospital, Bournemouth West.

Gas consumption for twelve months: 1,395,000 c.ft. = 6277 therms.

Cornelia Hospital, Poole.

Gas consumption for twelve months: 1,003,000 c.ft. = 4513 therms.

Gas-Fires in Bedrooms.

Another direction in which gas plays an increasingly important part in the domestic economy of the health resort is in the heating of hotel and boarding house bedrooms. A very large percentage of the inquiries received by hotel and boarding house proprietors contain requests for bedrooms fitted with gas-fires. This is good evidence of the increasing popularity of gas-fires, and emphasizes the desirability of hotel and boarding house proprietors having their rooms fitted with them. Of the inquiries received by one of the principal private hotels in Bournemouth from prospective Christmas visitors, 50 p.ct. contained requests for rooms fitted with gas-fires.

In Bournemouth such fires are usually fitted with shilling-in-the-slot meters, which are fixed in the bedrooms and supplied from the main house meter, which registers the total consumption of the establishment. The proprietor pays the Gas Company according to the registration of his main meter, and himself collects the shillings from the coin-boxes of the various bedroom meters. The amount of gas provided to the visitor for his shilling is based on a sufficiently higher rate than that paid to the Gas Company by the proprietor to cover the latter for the cost of installing the fire and meter. Generally speaking, the rate is about 2s. per 1000 c.ft. more than the Gas Company's rate.

With gas at 4s. per 1000 c.ft. from the Gas Company, therefore, the visitor would pay 6s. per 1000 c.ft., and for his shilling would receive 166 c.ft. of gas. With a medium-sized gas-fire turned on full for the first half-hour, and consuming (say) 60 c.ft. per hour, and with the gas from then onwards reduced to (say) 30 ft. per hour, he would get about five hours' use of the fire for his shilling. Or, if he used the fire for rising and retiring only—say, half-an-hour for each operation—it would serve him for probably three days for the same expenditure. In Bournemouth alone there are some 40,000 gas fires, and of these at least 2500 are in the bedrooms of hotels, boarding, and apartment houses. That gas-fires installed in bedrooms are used and appreciated by visitors can be gathered from the following figures, which are taken at random, of a few of the establishments which have installed them:

—	No. of Gas-Fires.	Consumption per Annum Before Fires were Fixed.	Consumption per Annum After Fixing of Fires.	Increase due to use of Gas Fires.	
		C.Ft.	C.Ft.	C.Ft.	P.Ct.
Woodleigh Tower .	16	507,000	769,500	262,000	52
South Cliff. . . .	27	634,000	780,000	146,000	23
The Grange . . .	19	268,000	384,000	116,500	44
Pinehurst	25	869,000	1,056,500	187,500	22
Ullswater	22	299,000	350,500	51,500	17

If the extra charge for gas used in the fires is taken at 2s. per 1000 c.ft., it is easy to estimate the sum per annum which must accrue to the proprietor to cover his capital expenditure. Added

to this, he has provided for his visitors a very welcome addition to their comfort during their residence in his establishment. The cost of installing the fires naturally varies considerably according to the circumstances of the case, and has averaged in Bournemouth between £5 and £6 each, complete with the fire. The installations are either sold outright or on the hire-purchase system, and the meters are either hired or purchased as the hotel proprietor may prefer.

ELECTRICITY GENERATION

In places such as cinemas, where the electric supply undertaking insists upon regarding the supply of current as a "lighting load," and charges for it accordingly, it is often possible to show considerable economies by the generation of electricity on the premises by means of gas-engines. A number of such installations have been erected in Bournemouth, particulars of which Mr. Moon gave.

Gas for these installations is charged at the power rate, with discounts for quantity; and the cost of current may be taken as varying from 3d. to 4d. a unit with present gas prices (10·7d. per therm for power), and after allowing for labour, oil, interest, and depreciation.

What applies to cinemas applies with equal force to hotels and other business establishments; and the author enumerated some which generate their own electricity in the Bournemouth Gas and Water Company's district.

Practically all the gas-engines for generating plants in Bournemouth have been supplied on hire-purchase terms.

LAUNDRIES.

Most seaside towns, with their large number of hotels and boarding houses, have an unusually large number of laundries. In Bournemouth there are at least sixteen large laundries, as well as a good number of medium and small ones. At least 75 p.ct. of the large laundries derive their power from gas-engines, and all of them use gas-irons with high-pressure gas on the Keith-Blackman principle. The smaller laundries use low-pressure gas-irons or gas-heated iron stoves.

Mr. MOON mentioned that the chief engineer of a large catering firm had stated to him that the cost of fuel was more or less a secondary consideration as compared with convenience of operation. He was a man responsible for hundreds of cooking installations; and he had stated that the convenience of using gas for cooking was such that it was likely to be employed in all branches of his firm, irrespective of cost.

DISCUSSION.

Mr. J. WESLEY WHIMSTER (Bath) said that there was a great similarity between Bournemouth and Bath; and he gave comparative figures. The cooking in hotels, boarding houses, hospitals, &c., was practically all done by gas; and the annual consumptions showed to what extent gas apparatus was used for the purpose. There were several hotels consuming 1½ to 1¾ million c.ft. per annum; boarding houses varied from 1½ to 1 million c.ft. per annum; hospitals from 7½ to 1½ million c.ft.; several schools used from 1½ to 1¾ million c.ft.; and several restaurants over 1¼ million c.ft. In connection with one of the restaurants was a bakery where the celebrated Bath Oliver biscuits and Bath buns were made; and in this bakery was installed a gas travelling oven, which had replaced eight coal-fired ovens. This oven was capable of turning out 1700 Bath buns every 6½ minutes, or 2500 Oliver biscuits every hour. The oven was heated by high-pressure gas. The advantages claimed were elimination of waste due to even temperatures, ease of regulation, and certainty of results. As regards labour saving, only two boys were required—one to feed and one to take off; whereas with the eight coal-fired ovens it required three skilled men and three boys to operate them. The eight coal-fired ovens consumed 14 to 16 cwt. of coal per day, costing, at 30s. per ton, 21s. to 24s. per day; whereas the gas consumption was only 420 c.ft. per hour, equal to 3780 c.ft. per day, costing about 9s. This oven was so satisfactory that it was proposed to instal another of two or three times the capacity. They had in Bath several hundred gas-fires in hotel and boarding-house bedrooms. These fires had been greatly appreciated by visitors, and had resulted in a considerable saving in expense to the proprietors who installed them. The average consumption varied from 7000 to 24,000 c.ft. per fire per annum. The use of gas for cooking and heating in hotels and boarding houses not only resulted in a saving of labour, but also, owing to the smaller staff required, more accommodation was available for visitors.

Mr. P. E. BROWNE (Brighton) remarked that Mr. Moon had said that there were 40,000 gas-fires in Bournemouth. He congratulated him, and wished he could say the same for Brighton. There he had about 18,000 or 19,000 on hire, and 5000 or 6000 which were privately owned. The point he would like to make was—whether Mr. Moon's figure was 4000 or 40,000, the essential thing was to keep track of them, in order to keep them up to date; and that was why he did not agree with the outright sale of fires. If the gas-fires were on the hire-purchase system, the gas companies could, as the patterns became obsolete, scrap them and offer something more modern to the consumer. When a consumer had a gas-fire which he had bought, he wanted to use it for ever. He congratulated Mr. Moon on his electricity generating plant, and he would endeavour to emulate him one day. At the same time, Mr. Moon was competing with a privately-owned electricity supply undertaking; whereas at Brighton they were up against a municipality.

The meeting expressed its indebtedness to the authors of the papers, and adjourned.

(*To be concluded.*)

DESIGN AND CONSTRUCTION OF A 12½-MILLION GASHOLDER.

By R. J. MILBOURNE, Assoc.M.Inst.C.E., F.C.S.

(*Continued from p.* 229.)

GUIDE-FRAMING.

There are thirty-four standards, five rings of intermediate horizontal girders, and one ring of top girders. Six bays are thus created between any two standards.

In designing the guide-framing, particular care was taken to avoid all complicated or unusual sections, as well as any places or pockets where there is a possibility of water collecting.

STANDARDS.

The height of the standards from their foundation to the top of the cast-iron finial is 188 ft.; and they are made in five lengths. The width from back to front is 7 ft. 6 in. at the sole plate, tapering gradually to 3 ft. at the top. The standards rest on heavy cast-iron bases, which are held-down by the four 2¾ in. diameter foundation bolts, swelled at their ends. The cast-iron bases were filled-in solid with cement grout; great care being taken that the grout was of such a nature that it would not swell in setting and crack the castings.

In order to secure a perfectly level bed, the top faces of the cast-iron bases were planed perfectly true over the whole of the bearing surface. The standards were firmly bolted down to these by bolts passing through the strong steel base-plate and angles.

Both the front and back members of the standards consist of 18 in. by 7 in. by 7 in. by 75 lb. rolled-steel joists, arranged so that their webs are parallel and their joints opposite. These front and back joists are connected together horizontally, except at the junction of the girders, by means of 6 in. by 4 in. by ½ in. tees riveted thereto at regular intervals; the double cross-bracing consisting of flats 6 in. by ½ in. for the bottom lengths, decreasing in width to 3½ in. by ½ in. for the top or fifth length, strongly riveted to the back and front joists and to each other where they cross. The sole plates of the standards are ¾ in. thick by 4 ft. wide from side to side. The rolled-steel joists at the bottom of each standard are tied together by means of ¾ in. web plates, which are attached to the sole plates by means of 6 in. by 6 in. by ¾ in. angles and four gusset plates strengthened by angles on each side of them, while the tops of the web plates are tied together by a ½ in. plate and angle.

At the junction of the girders the rolled-steel joists forming the fronts of the standards are united to those forming the back by two ½ in. web plates riveted to each side of the flanges of the rolled sections. The paths for the rollers of the carriages, consisting of lengths of 8 in. by 6 in. by 6 in. by 37 lb. rolled-steel joists extending from the level of the cast-iron standard bases to the tops of the standards, are arranged so that the radial rollers of the lifts run on the web, and the tangential rollers on tables of the same section. These roller-carriage paths are secured to the standards through pressed-steel stools, except at the junction of the joists, where cast-iron stools, well bedded to the section of the roller-path joists, prevent any movement of the ends of these joists. The length of the 18 in. by 7 in. by 7 in. rolled-steel joists forming the standards are jointed with two ¾ in. flange-plates and with two ⅜ in. web plates, each bent to fit web and flange.

Care was taken, in sawing the ends of the bars, to see that they were dead square; and before they were marked for drilling, each bar was fitted to the next one and both marked off together, thus ensuring that the standards would be perfectly straight through the joints bearing properly for the full width.

The cast-iron distance blocks behind the back members of the standards were made to fit close up to the standards; and in order to make the joints perfectly water-tight, these blocks were bedded in red lead.

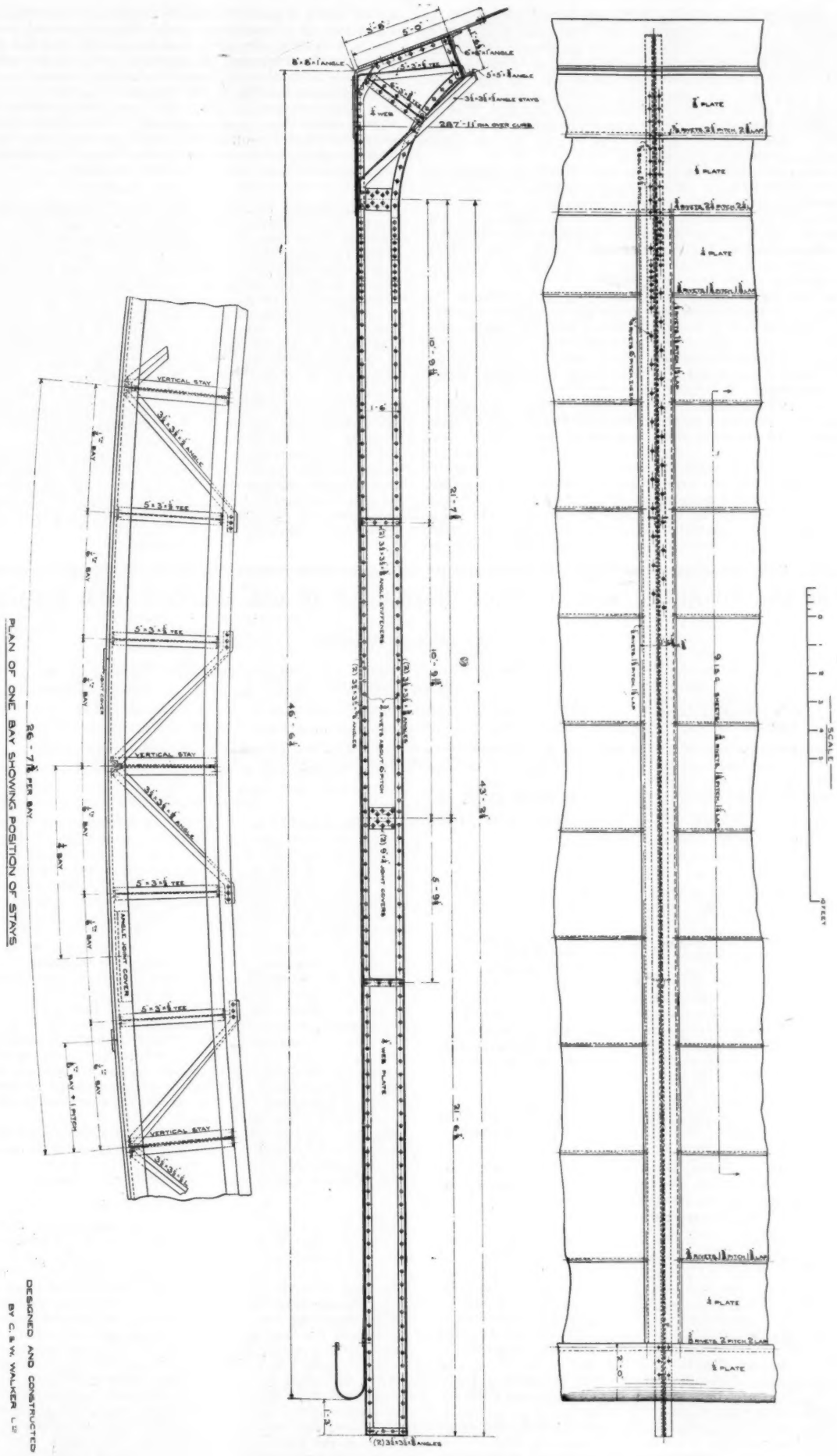
The holes in the bases were made large enough in the lower plate at base to ensure that the grout would run in solid without their being blocked when filling-in from the upper plate level. If desired, a saving could be effected by putting in large stones, and then filling up with grout, so long as there is a free passage for it around the boulders or clinkers, as the case may be, so that the grout may fill up all interstices.

Each of the thirty-four standards was fitted together for its entire length before dispatch, and carefully examined and tested for straightness with a theodolite.

HORIZONTAL LATTICE GIRDERS.

The first five rings of horizontal struts or girders are each composed of two 12 in. by 3½ in. by 3½ in. by 26 lb. steel channels, stretching from stanchion to stanchion, and arranged so that the inner ring connects the front joists of the standards, and the outer the back joists.

The upper flanges are braced together by means of 4½ in. by 3 in.



GASHOLDER—12½ MILLION CUBIC FEET CAPACITY.

by ½ in. angles in the lowest tier, gradually reducing until 3 in. by 2½ in. by ½ in. angles are used in the fifth. The lower flanges of the horizontal girders are tied together in the same way as the upper. Gusset plates ⅜ in. thick tie together the flanges at the ends of the girders, and to these are riveted 4 in. by 4 in. by ½ in. angles, which, in their turn, are riveted through ⅜ in. plates secured to the standards at the junction of girder and standard. The top ring of girders is of latticed box pattern 4 ft. deep and 3 ft. wide at the top. It is composed of four 5 in. by 4 in. by ½ in. angles strengthened in the following manner.

The tops and bottoms of these girders are double-braced by means of 3 in. by 2 in. by ½ in. steel angles riveted to the angles at their ends and together at their centres, while the sides are double-braced by means of 4 in. by ½ in. flat steel bars riveted in a similar manner. Gusset plates, top and bottom, connect the ends together, and to these are riveted 4 in. by 4 in. by ½ in. angles, which are themselves riveted through the ½ in. plates to the standards.

At the junction of the first five girders with the standards, the front and back members of the latter are connected together by ½ in. plates riveted to both outside and inside of the flanges; those attached to the latter being stiffened at the top and bottom by means of 4 in. by 3 in. by ½ in. angles, while the rivets uniting the inside and outside plates also pass through ¾ in. packing pieces between the plates.

There are also arranged at these junctions on front and back of the standards two large ⅝ in. plates, these uniting girder and standard together by means of rivets and bolts. Those on the back of the standard in addition also form part of the anchorage for the eyes, which are formed in the ends of the round bars comprising cross-bracing in the bays formed by standard and girder. These plates are bolted to the webs of the 18 in. by 7 in. by 7 in. standard joists through heavy castings, bossed-up at the bolts, and provided with flanges, which close up the otherwise open nuts. The other portion of the cross-bracing anchorage (which, as stated above, is partly formed by the plates on the backs of the standards) is composed of double-flanged pressed-steel corner pieces, ⅜ in. thick, riveted to both the girders and the standards and specially thickened, the junctions at the lower ends of the standards being also reinforced in a similar manner.

The bracing junction at the top ring of girders is constructed in a similar manner to the lower ones, but is made deeper to accommodate the 4 ft. deep girders. A ⅜-in. plate on the top of the standard projects inwards to hold the end of the 8 in. by 6 in. by 6 in. rolled-steel joist, which forms the roller path and carries the cast-iron finial on the top of each standard.

TIE-RODS AND BRACING.

In the spaces formed between the standards and the girders cross-bracing is arranged. It consists of round steel bars, held together where they cross by means of a simple system of three plates, two being curved round the bars. Each tie-rod is fitted with a right and left hand screwed coupling-box, these being considered preferable to the usual centre rings with double nuts for tightening up the tie-rods. The coupling boxes are introduced at convenient positions near the girders, so that any adjustment can be readily made. The rods are swelled at the ends where they enter the coupling boxes, and are screwed a larger diameter than the diameter of the body of the rod. On the ends of each tie-rod a single eye is formed, through which a pin passes to connect the tie-rod to the bracing junction, and, in the case of those in the first bay, to the base of the standard. The tie-rods are arranged on the back or outer edge of the standards, and range from 2⅜ in. in diameter in the lowest bays to 1½ in. in the highest.

The couplings were not screwed-up to such a degree as to throw excessive initial tension on the rods. They were supported in the centre during the tightening up, to prevent sagging, thus making it easier to screw them up by keeping the rods in a straight line, and preventing undue stress on the screwed portion of either the couplings or the rods.

(*To be continued.*)

WALES AND MONMOUTHSHIRE DISTRICT INSTITUTION OF GAS ENGINEERS AND MANAGERS.

AUTUMN MEETING AT PORTH.

THE new President of the Institution, Mr. OCTAVIUS THOMAS (who has long been Hon. Secretary of the Institution, and is Engineer and Manager of the Gas and Water Departments of the Rhondda Urban District Council), was well supported last Wednesday, when a meeting was held at Porth, Rhondda. In addition to the Presidential Address, the new education and certification scheme was discussed; but through lack of time a paper by Mr. J. Mogford, of Briton Ferry, had to be taken as read, and left over for discussion at the next meeting. The afternoon's visits provided much of interest to the members.

The meeting was held in the Porth Lower Police Court, the chair being taken at the opening of the proceedings by Mr. JAMES ROBB, of Chepstow, the outgoing President.

A WELCOME TO RHONDDA.

Mr. ROBB said they had with them the Chairman of the Rhondda Urban District Council (Mr. R. Harcombe), and he would ask him to say a few words before they started the proceedings.

Mr. HARCOMBE, speaking on behalf of the Council, said he wished to extend to the members a very cordial welcome, and though perhaps they would not find anything picturesque in the Rhondda, he hoped the visit would prove a pleasant one. He was glad to see that the Council's Engineer and Manager had been elected President of the Institution, for he had been closely associated with Mr. Thomas in his work. The price of gas in the district was certainly high; but if they realized the difficulties under which the undertaking laboured, it would be admitted that there was an explanation for this.

MINUTES OF THE LAST MEETING.

The HON. SECRETARY (Mr. Octavius Thomas) then read the minutes of the last general meeting, and they were confirmed.

NEW MEMBER.

Mr. Herbert James White, Manager of the Bridgend (Glam.) Gas Company, was elected a member, on the proposition of Mr. F. HILL (Usk), seconded by Mr. F. G. JENKINS.

THE NEWPORT ELECTION.

Mr. ROBB remarked that, as the members were aware, a very important election had just taken place in the district, the result of which had reflected great honour upon them as an Institution. He referred to the return to Parliament for Newport of their old friend Mr. Reginald Clarry. Apart from all questions of politics, he might be relied upon to look after the interests of the industry; and he proposed that a resolution from the meeting be forwarded to Mr. Clarry congratulating him upon his success at the poll.

Mr. THOMAS, in seconding this, pointed out that Mr. Clarry had been a member of the Institution almost from the start.

Mr. W. H. JOHNS said that as Mr. Clarry's successor at Swansea, he would like to support the proposition.

The motion was carried unanimously, and the following resolution was drafted:

> That we offer our heartiest congratulations to Mr. R. G. Clarry on his great success at the Parliamentary Election at Newport, and wish him every prosperity.

THE NEW PRESIDENT.

Mr. ROBB said he now had pleasure in introducing to the meeting as the new President their good friend Mr. Thomas. He himself had had a very pleasant year with Mr. Thomas as Secretary, and knew that he would make an excellent President.

Mr. OCTAVIUS THOMAS (who was cordially received on taking the chair) said that his first duty was to propose a vote of thanks to the retiring President, who had carried out his duties to the entire satisfaction of the members. One feature of his year of office was the invitation he gave to wives and lady friends to join the visit to Chepstow, which was thoroughly enjoyed.

Mr. H. D. MADDEN (Cardiff) said it was a great pleasure to second the vote. He did not know as an Institution what they would have done without Mr. Robb. All through the war his cheery optimism had helped considerably to keep them going; and when he was President, the visit to Chepstow became an outstanding feature of the history of the Institution. In representing as their President the South Wales district in London, he had done very good work. He had never been afraid to speak his mind, and had always stuck-up for the industry, and particularly for the South Wales section of it.

Mr. ROBB, in acknowledgment, said he had certainly tried to do his best for the industry, and if the necessity arose he would do the same thing again.

Mr. THOMAS then proceeded to deliver the following

PRESIDENTIAL ADDRESS.

The honour which you have conferred upon me in electing me as your President is highly appreciated; and it will be my aim to merit the confidence you have reposed in me, and my duty and pleasure to give of my best to the Institution, as I have endeavoured to do in the past as your Secretary. In my earlier days I did not have the privilege of attending these meetings and visiting the various works in the district; but after attending the meetings of the Institution of Gas Engineers and other District Associations I realized the great benefit to be derived therefrom. For this reason I have done what I could for our own district; and it is with great pleasure and satisfaction that I have seen how the members have appreciated the benefits of such an institution. At the same time it must not be thought that I did all the work—it would not have been so successful if I had not had the help and support of the Past-Presidents and other members. The list of names is too numerous to give; but I cannot refrain from mentioning the late Mr. Thomas Canning, who, above all others, was instrumental in making it so successful.

PERSONAL EXPERIENCE IN THE RHONDDA VALLEYS.

So many presidential addresses have been given that it is difficult to bring forward any new subject. Therefore I think it wiser to give you some particulars of my experience in the Rhondda Valleys. The Rhondda Urban District Council purchased the undertaking of the Ystrad Gas and Water Company, and on completion I took control on March 31, 1898. The purchase price paid to the Company was £139,669. The quantity of gas sold the previous year was 60,271,200 c.ft., which works-out at £2317 per million c.ft. of gas sold. The interest and repayment of loans amounted at that time to 28·23d. per 1000 c.ft. of gas sold—a heavy burden to start with. The area of the gas district supplied by the Company was 19,770 acres, containing 15,800 houses, with an estimated population of 94,800 persons. At the transfer the number of consumers was 1796, consisting of shops, hotels, and the larger houses, &c. The greater number of the houses in the district consists of cottages; and I came to the conclusion that the best way of increasing the consumption of gas was by fitting up the cottages on the prepayment system. I did not fix slot cookers free, as the greater part of the population obtained coal at a low price; but I have been able to hire and sell a large number of gas cookers, grillers, boiling rings, &c., with profitable results. The district is supplied with gas from two works—one situated at Porth, at the lower end of the Valley, and the other at Ystrad, about six miles up the Rhondda Fawr Valley.

At the transfer I found all the retorts were heated by direct firing and hand charging; and as the retorts had to be renewed, my first work was to put in regenerator furnaces, by means of which I largely increased my output of gas, and my coke sales per ton of coal carbonized by 50 p.ct. The larger works are at Porth; and having only an acre of land, I soon realized the advisability of starting a works on a new site, where gas could be produced on a more economical basis. Having reported the matter to my Committee, however, they could not see their way to carry out my recommendation.

STORAGE CAPACITY.

The next thing I had to deal with was storage accommodation; and as there was no room at the Porth works at that time, it was decided to erect a gasholder at Tonypandy—a large populous district situated about 3½ miles from Porth, and between that and the Ystrad Gas-Works. Although I have trebled the consumption of gas, by filling this gasholder in the day by means of a gas-engine and exhauster I have been able to give a full supply at night without increasing the size of the trunk mains. Similarly, I have another gasholder station at Treorchy, about 3 miles higher up the valley than the Ystrad works. In 1903, the Council purchased the stables belonging to the old Horse Tramway; and as the ground was not required for the new electric tramway, and it adjoined the Porth works, I was able to purchase it from the Council for the Gas Department. The area of the land was half-an-acre, and our own site contained one acre.

A SETTING OF INCLINED RETORTS.

With the rapid increase in the consumption of gas, the time had now arrived when it was necessary to extend producing power. At that period inclined retorts were the most successful, and I decided to put them in; and they have worked very satisfactorily since. I was also able to utilize the stables partly for a purifying house, meter-house, workshops, stores &c.

PROGRESS.

The progress of the undertaking is shown by the following quantities of gas sold for the years ended March 31: 1898, 61,384,100 c.ft.; 1903, 107,898,600 c.ft.; 1908, 145,695,200 c.ft.; 1913, 185,364,400 c.ft.; 1915, 202,362,300 c.ft.; 1922, 161,882,000 c.ft. The following shows the increase in the number of consumers: At the transfer, March 31, 1898, 1796; on March 31, 1903, 5172; 1908, 9232; 1913, 13,141; 1915, 14,464; 1922, 14,483. Out of the foregoing I have fitted nearly 9000 houses on the prepayment system. Since 1915 I have not done any house fitting, owing to the price of materials and labour; but when prices become normal again, I shall still be able to fit up a large number. During the war the consumption of gas decreased about 20 p.ct., partly due to the introduction of electricity, but principally to the difficulties I experienced while the supply of coal was under control, in not being able to give a proper and efficient supply of gas with the coal at my disposal.

This district, as you are aware, is entirely a mining one, and some millions of tons of coal and rubbish are taken out of the earth annually, with the result that subsidence takes place abnormally in certain parts of the valleys. In the year 1898, the Ordnance Survey Department took the levels in the valleys; and at the request and expense of the Rhondda Council, owing to the trouble they were having with their main sewer, re-levelled the main roads of the two valleys in 1910—twelve years after.

SUBSIDENCE AND LEAKAGE.

The greatest subsidence was at Llwynypia, nearly 8 ft.; and to show how abnormal it is, the amount was only 2 ft. 8½ in. in Tonypandy, 339 yards lower down the valley, and only 6 in. 420 yards higher up the valley. This latter is situated on the coal pillar that is usually left to protect the pit shafts and colliery buildings. For several years I had men repairing the weekly leakages and broken gas and water mains in this area. The Porth Railway Bridge shows 3½ ft.; but there was a difference of 6½ ft. between the levels taken in 1875 and 1898; thus making a total of 10 ft. in 35 years. In the Rhondda Fach Valley, at Ynyshir, there was a difference of 3 ft. 3 in. within a distance of 305 yards. This district has required constant attention. The length of gas-mains when I took charge was 25¾ miles. It is now 75½ miles, ranging from 15 in. to 2 in. in diameter, and there are over 50 miles of service-pipes.

After this information it is hardly necessary for me to tell you that the question of leakages is one of great anxiety and importance, and necessitates having men continually looking for them. Owing to the scattered nature of the district, this work is carried on by three gangs of men, who start at a given point in each area and go over the whole district, except when we receive complaints of leakages, when these receive prompt attention. I have a Thorpe's waste-gas meter fixed at each works, which gives me some idea of the leakage going on. Having two gasholder stations, I am able to test certain parts of the district in the early hours of the morning in the summer, which is a guide as to where the worst leakage is taking place. I also test each separate street off the mains roads periodically by meter; and if any leakage is registered, the whole street is thoroughly overhauled. In the case of a long street, it is divided into two or more sections according to length, and tested by meter, and thus the position of the leakage is ascertained more accurately. By working in this way I save a lot of expense in barring the roads.

The following table gives the number of broken mains, leaky joints found, and the unaccounted-for gas during the past ten years, up to March 31 in each year:

—	Broken Mains.	Leaky Joints.	Unaccounted-for Gas.
			P.Ct.
1913	18	1791	18·75
1914	22	2241	17·85
1915	34	1454	14·39
1916	29	1210	20·35
1917	23	1123	28·78
1918	54	1393	28·10
1919	36	984	22·19
1920	26	2016	18·62
1921	19	1081	19·27
1922	15	935	22·14

During the war period I was not able to have the number of men required to look after this work, as 40 p.ct. of the men employed in the Gas Department joined up. You will notice that the number of broken mains was largest during the year ended March 31, 1918—possibly due to the heavy demand for coal during that year.

The strain put upon the mains and services in colliery districts is very great. As examples, I found a 6-in. main broken, and that the spigot end of one pipe had passed the socket of the next by 4½ in.; a 6-in. steel main was found broken, the socket split, and the spigot end of the adjoining pipe beyond the socket by 5 in. In another case, where a service pipe had been continued on a road for a street lamp, in extending the main the service pipe was found separated 9 in.; but as it was in clay soil, there was sufficient opening for enough gas to pass for the lamp. In some parts of the district where the strain is on the service pipe, I put in a short length of lead pipe, in the shape of an S bend, to allow for the pressure put upon it. This prevents any leakage for a time.

AN UNLEVEL GASHOLDER.

At our meeting in September, 1912, I read a paper entitled "Repairs to a Leaky Gasholder Tank," in which I stated that, owing to subsidence from colliery workings, the tank situated at the Porth Works was 11 in. out of level, and gave some particulars of the new side plates I fixed. My next difficulty was that the gasholder, which has two lifts, became so much out of level that the water in the cup, when 4 to 5 ft. out of the water, commenced to run out. As a consequence the gas in the outer lift used to blow out and empty. To stop this, I bolted some boards on the lower side of the outer lift, making a joint water-tight by means of clay, and thus maintained the required depth of water in the cup to form the seal. This acted very well from 1912 to 1919, when, owing to further subsidence of the tank, the gasholder became more out of level, and the cup again began to blow. Early in 1920, I found the tank 17½ in. out of level; and I decided to have the holder re-levelled. After reporting the matter to my Committee, I obtained their sanction to proceed with the work.

As it was impossible to state what work was required to be done to put the holder into proper working order, I arranged with Messrs. Robert Dempster & Sons, Ltd., of Elland, to send me a skilled man with the necessary tackle to carry out the work; and I provided all the unskilled labour required. The holder was put out of action on June 14; and after emptying the tank of water, I thoroughly examined it, and found further cracks and cavities under the bottom of the tank—which is of cast iron. These I filled with cement, and the leakage of water was further reduced; so that although it is still necessary to keep a pump continually pumping back into the tank, I have no difficulty in maintaining the water at its proper level without having to use the town supply.

The first proceeding was to fix a manhole on the side of the inner lift to get in between the two lifts. The outer lift was then raised about 3 ft. above the bottom of the tank by means of screws and chains, and new rest blocks of cement concrete put in

place of the then existing ones, varying in height from 6 in. to 24 in., and carried into the tank as far as the inner lift of the holder. We could not go further, as this was resting on the existing blocks in the tank. When these blocks had set, the outer lift was lowered on to them, and we proceeded to raise the inner lift; but as there was not sufficient room between the lifts, owing to the alteration of the outer lift level, this was done by means of screws, &c., inside the holder, and the rest blocks completed and the inner lift lowered into position after they had set.

The next thing to be done was to alter the tank guides to make them plumb. Some had to come out at the top and some at the bottom; the space between them and the tank being filled in with bricks and cement. We made use of as many carriages and wheels as possible, and obtained smaller wheels for the remainder. The wrought-iron standards and guides had to receive attention to make the guides plumb. After full consideration, it was decided not to take the standards and girders down, but to lift them gradually, by means of wedges, off the cast-iron base of the standards where necessary; the variation being from nothing on one standard to 17 in. on the one opposite. Fresh holding-down bolts of the required length were then fixed to the cast-iron base, and the space between filled in with bricks and cement. After refixing the carriages and wheels on the cup of the outer lift and the top of the inner lift, and fixing new ones where it was necessary, the tank was filled with water, and the holder filled with air and thoroughly tested; and it has worked very satisfactorily ever since. The whole of the work was completed in ten weeks, at a cost of a little under £1000.

EDUCATION IN THE INDUSTRY.

Last year we were able to start a gas-supply class at the Cardiff Technical College, with the assistance of Mr. George Clarry, which was very successful. Another class has commenced this year; but the students are all from Cardiff. I wish to draw attention, however, to the fact that this was arranged for anyone in the gas industry in this district; and I hope the members of our Institution will see if it is possible for some of their staff to attend. It has meant a lot of trouble to obtain the class; and now it has been formed I am most anxious that it should be continued, as I feel sure it will be of great benefit to the district. The Institution of Gas Engineers has prepared a scheme for the future education and examination of those engaged in the technical work of the gas industry, a copy of which has been sent to all the members; and if it is carried out, I feel sure it will be of great benefit. I cannot speak too highly of our Technical Press; for some years it was the only means I had of knowing the progress that was taking place in the gas profession; and I recommend the younger members especially of our Institution carefully to read the papers weekly.

ASSOCIATION REPORTS.

I was sorry to hear of the late Mr. Walter King's decision to give up publishing the "Reports of the District Associations." It was a book of most useful information; and I cannot see why, with such a large membership as the District Associations have, some satisfactory arrangement cannot be made to have them published in the future. I receive repeated applications from our own members for copies.

I cannot conclude without referring to the benefit the gas industry has derived from the work of the National Gas Council and the Federation of Gas Employers. As one who has taken a little part in the work of the latter, it is a source of great satisfaction that the friendly feeling existing between the employers and employees has been due to the excellent work carried on by the Federation; and I hope those members of our Institution who have not joined will realize their duty to do so.

THE PRESIDENT THANKED.

Mr. JOHNS said it was his pleasure to propose a hearty vote of thanks to the President for his address. They would all agree that it had been highly interesting—particularly as, fortunately for them, they were mostly not called upon to deal with such a difficult district as that of which Mr. Thomas had charge. The President must pass through very anxious times in dealing with the subsidences which occurred in the district. They had with them that day Mr. Walter Hole, who was one of the greatest authorities on mainlaying and distribution problems generally; and probably, even with his wide experience in the north, Mr. Hole had never had to deal with so many breakages and drawn joints as the President met with in his district in South Wales. He (Mr. Johns) knew something of the difficulties of working under such conditions, because when he was Engineer at West Bromwich the same troubles arose in some degree. It was proof of Mr. Thomas's ability that, in all the circumstances, his unaccounted-for gas was not even higher than they found it. He congratulated the President upon the way in which he had overcome the difficulties in connection with the gasholder—particularly as the labour was local labour, and in these circumstances much responsibility must have fallen upon the shoulders of Mr. Thomas. The work might very easily have cost very much more money. Mr. Thomas had long been associated with the Institution as Hon. Secretary, and his work in this connection had always been done to the entire satisfaction of every member and with the greatest credit to himself. He was long overdue in reaching the position he had just taken up. ["Hear, hear."]

Mr. ROBB, in seconding, said he also had had some experience of broken mains in the Forest of Dean, and so could form an idea of what Mr. Thomas had had to face. That he had been able to deal with his difficulties as he had, showed their President to be a man of exceptional skill, and the Council of the Rhondda were to be congratulated upon having so experienced and earnest an engineer in charge of their undertaking.

The resolution was heartily agreed to, and briefly acknowledged by the PRESIDENT.

REPRESENTATION ON THE INSTITUTION COUNCIL.

Proposed by Mr. J. MOGFORD (Briton Ferry), and seconded by by Mr. J. H. CANNING (Newport), Mr. Thomas was appointed to represent them on the Council of the Institution of Gas Engineers for the year commencing next June.

SCHEME FOR THE FUTURE EDUCATION AND EXAMINATION OF THOSE ENGAGED IN THE TECHNICAL WORK OF THE GAS INDUSTRY.

The PRESIDENT said he had now pleasure in introducing to the meeting Mr. Walter Hole, and in calling upon him to explain, as the representative of the Institution of Gas Engineers, the new education and examination scheme for those engaged in the gas industry.

[The details of the scheme as circulated by the Institution of Gas Engineers will be found on p. 289 of this number of the "JOURNAL."]

Mr. WALTER HOLE, in explaining the scheme, said that it had been evolved by representatives of the Institution of Gas Engineers and of the Board of Education; and the latter body wished to meet the Principals of the Technical Institutions of the country and talk things over with them before the scheme was made public. Dr. Morley, of the Board of Education, had now stated that, so far as the Board were concerned, the way was clear for publication. The Institution were very anxious, if it was at all possible, that the scheme should come into operation for next winter's Technical Institute work; and if this was to be done, the scheme must be out of the Institution's hands by February. As a matter of fact, the Institution were calling a special meeting in February to consider finally the draft scheme; and if it met with approval, it could then go forward for details to be worked-out in such time as would allow it to be brought into operation for the following winter. He thought they would all agree with him that the period of evolving the scheme had been very long, and it was imperative in the best interests of the industry that it should be brought into operation at the earliest possible moment. As to the scheme itself, it would be noticed that it divided itself up into three sections. First of all there was what might be called the main scheme, which governed the ordinary student; the second section covered what might be called an extraordinary class of student; and the third dealt with still another class.

Looking at the first section from the point of view of the student, proceeded Mr. Hole, it provided that a youth leaving school at fifteen or sixteen years of age should undergo a three years' group course of instruction along one of two main avenues. He could either go through the gate of engineering or through the gate of chemistry, taking up subjects appropriate to the line selected. After two years' preliminary training upon one of these lines, in the third year he would take gas engineering or gas supply. This provided a three years' course for the examination and certificate in the ordinary grade. The student desirous of taking the next stage—the higher certificate—would go through a further two years, during which he would continue his studies mainly along the line which he had previously marked out for himself, but probably widened in their scope; and at the end of the second year he could be in a position to take the examination for the higher certificate. So that, putting the two courses together, it meant five years, which would permit a youth leaving school at sixteen to obtain the higher certificate at the age of twenty-one. This was the scheme as it applied to the generality of students who were able to take gas engineering or gas supply at any of the Technical Institutes of the country.

The whole question came up really on a resolution of the Board of Education to the effect that in future all the examinations for the first grade in gas engineering or gas supply must be made by the teacher of the class in the Technical Institute itself. That was to say, the teacher of gas engineering or the teacher of gas supply must set the questions and examine his own pupils in that subject. One could see the difficulties and dangers of such a proposal as this. There were various Technical Institutes up and down the country; and if each teacher was to set his own standard of questions and his own standard for the marking of papers, there might be as many standards of value of certificates as there were examining centres, and the result would be to degrade the whole lot of the certificates to the level of the lowest. This was a position that the Committee of the Institution of Gas Engineers appointed to deal with this question of education felt that they must grapple with; and they got a remarkable concession from the Board of Education. First of all, as part of the organization behind the whole scheme, there was to be an Advisory Committee, which would consist of three members of the Board of Education, a Sub-Committee of six nominated by the Institution of Gas Engineers, and two members representative of the various Junior Gas Associations of the country. So that with eight members representing the gas industry, they had the fullest control of the whole of the machinery; and this Advisory Committee would have power of such amendment or modification of the scheme as experience showed to be absolutely essential.

And in addition to the Advisory Committee there was to be a Consultative Committee. It was essential, if this scheme was going to be a success, that they should have the whole-hearted support of the Technical Institutes; and it was felt that they should call them into consultation. In addition, they had secured co-ordination of study on the part of the student. Nothing had been worse in past years than the haphazard way in which students had taken their subjects. They had co-ordination of control, and the Institution had the power of satisfying themselves as to the qualifications of the teacher, as to the equipment of the school, and, in the last resort, as to the suitability of the student. The Institution also had full control of the curriculum and of the syllabus. They had secured flexibility, too, as well as uniformity. The danger of the difference of standard had been met in this way. The teacher must, two months before the date of the examination, forward to the Secretary of the Institution a list of the questions he proposed to put to the students. The scheme provided for an Assessor, to whom all the questions must be sent. He would have the power of elimination, amendment, or substitution. By having all the questions forwarded to one man who possessed this power, they secured something like uniformity of the standard. Then when the papers had been marked by the teacher at the Institute, the whole of them must go to the Assessor for his confirmation of the marking. Thus they would get uniformity of standard of marking, and so something like uniformity in the bread-and-butter value of the certificate, which would be obtained from the Institution of Gas Engineers, endorsed by the Board of Education, and which would have recorded on its face the cognate subjects which the student had taken.

Explaining other points about the scheme, Mr. Hole said that in 1913 (which was high-water mark) there were 27 Institutes in the whole of the country which took gas engineering or gas supply as part of their curriculum. Of these, nine were in Yorkshire, three in Lancashire, and ten in London—leaving only five for the rest of the country. It was felt that something must be done for the wide area that was thus not adequately covered in the matter of gas engineering and gas supply, though possessing many Institutes where students could obtain chemistry or engineering courses. The second section, therefore, applied to those men who were in areas where they could secure instruction in cognate subjects, but not in gas engineering or gas supply. The scheme set up a method by which any student might apply to the Secretary of the Institution of Gas Engineers by a certain date of the year (Aug. 31), saying he wished to sit for a gas examination in the following year. After these applications had been received, if there were a sufficient number from any particular district to justify the formation of classes, the Board of Education would put pressure upon the Institutes in these districts to start classes. Then the examination would take place under the same conditions as in the other case.

The third section covered the higher class of students, who were aiming at the best positions the industry had to offer—articled pupils, university students, or men of that type. With the diploma, there were several differences. It was obviously absurd to suggest that a university student taking chemistry should take chemistry again on a lower grade than he had already. Therefore the university student or articled pupil would not have to take the cognate subjects, as would have to be done by the students working under the first or second schemes; but he would have to show that he had had instruction up to an equivalent standard; and an original thesis would be insisted upon, which should provide valuable material for the benefit of the industry. There was also to be a *vivâ voce* examination, to eliminate those who were not really practical men.

If the members were satisfied that along general lines and general principles there had been evolved a good scheme, they might, without stressing details, pass a resolution supporting it. They could then get to work with the scheme, which, as he had said, could be modified later, if found necessary. It was of the first importance that another year should not be thrown away.

Mr. ROBB said that doubtless all would wish to give the scheme their support in a tentative way. Probably little defects would be found which could be rectified as time went on. Many of the men in the industry were self-made men who had had very little education, but were thoroughly sound, practical engineers, and had acquired chemical knowledge and so forth in their leisure hours. Had any arrangement been made to keep these men in the position they should occupy? Certificates should be awarded to those who had shown their ability by the successful working up to the present time of the undertakings of which they had charge. Then there was the question of the isolated districts. In Scotland and Ireland towns were few and far between, and it would be most difficult for some of the students who might be desirous of sitting for an examination to attend classes. There should be some arrangement by which such men could qualify themselves by correspondence to sit for examination at certain centres. Then with regard to young men who went to the war at about nineteen years of age, whose studies were therefore broken. Some provision should be made for men of this sort who had shown aptitude. In the smaller works men had to manage every department, and there seemed no provision for such a man taking the whole of the branches. It should be possible under the scheme for a man to get from the lowest rung of the ladder to the top rung. He did not think a diploma should be given to a man until he had been an assistant in a works, and had shown that his work had been successfully done.

Mr. MOGFORD seconded, and thanked Mr. Hole for the lucid manner in which he had explained the scheme.

Mr. CANNING heartily supported what he termed a most admirable scheme. No scheme proposed as this had been, without having practical experience of its working, could be anything more than tentative. He felt they would be doing the right thing in giving the Institution Council their cordial support in initiating the scheme. The matter had been too long delayed. The gas engineer had to know a good deal more than most other engineers in their various branches; and consequently he (Mr. Canning) personally welcomed this scheme as a beginning, so to speak, of the work of placing the gas engineer and the gas industry in their proper position. He noticed it was suggested that the standard for the pass should be 40 p.ct. of the highest possible, and this seemed to him a little low. The student should be able to get "half way," and 50 p.ct. was a reasonable figure. Rather wide discretionary powers were given to the Advisory Committee. He quite agreed that during (say) the first five years in which this scheme was on trial—the period of transition from the old chaos to the new orderly system—there would be special cases of hardship; and he thought if the discretionary power were limited to this or some other period, it would tend to make it clear that every candidate had to go through the gate which had been provided. In the ordinary grade, it was proposed that the teachers themselves should set the examination papers, and that then the Assessor should endeavour to co-ordinate them throughout the country. He agreed that the teacher should examine his class in trial examinations, to ascertain the efficiency of the students; but he did not altogether agree that the teacher should set the paper which was to qualify. He would suggest, if it could be done, that it would be advisable to have one uniform examination, even for the ordinary grade.

Mr. MADDEN also supported the scheme, for he knew how long the difficulty had been with them in the Institution. The Committee who had tackled this had resolved something which was to the credit of the industry, and which would be to the betterment of the Institution. Other branches insisted upon a curriculum and proper training, and why should not the gas industry do the same? Furthermore, it would improve the status of the individual engineer or chemist. They must have well-trained minds; and he was positive that the higher the technical training that was insisted upon, the greater would be the benefit to the industry in every possible way.

Mr. HOLE, in reply, said the inside examination only referred to the ordinary grade certificate. The discretionary power was only to excuse students taking, on a lower grade, subjects they had already taken on a higher grade. The 40 p.ct. pass was a usual one. Did the scheme provide the possibility of a man rising from the lowest to the highest rung of the ladder? It did. Whatever his circumstances might be, the man who trained under this scheme could go right from the bottom to the top.

It was unanimously agreed:

> That this meeting of the Wales and Monmouthshire District Institution of Gas Engineers and Managers, having been supplied with copies of the scheme for the future education and examination of those engaged in the technical work of the gas industry, without committing themselves to detail, give the scheme their support.

GAS SUPPLY IN SOUTH WALES.

Mr. J. MOGFORD, of Briton Ferry, presented a paper dealing with "Gas Supply in South Wales: Its Past and Prospects." Owing, however, to lack of time, consideration of it had to be left over until the next meeting.

[The paper will be published in an early issue of the "JOURNAL."]

PLACE OF NEXT MEETING.

The place of next meeting was left to the Council to determine.

LUNCHEON.

A move was then made to the Porth Hotel, where the members and visitors were the guests of the President at luncheon. After the honouring of the Loyal Toast,

Mr. MADDEN said he regarded Mr. Octavius Thomas as the oldest friend he had in South Wales. When he came to Cardiff as a stranger from London, it was the helping hand held out by Mr. Thomas that made him quickly feel he was among friends. The toast he had to propose was "The Rhondda Urban District Council;" and one of the good things that came from the Rhondda, so far as he was concerned, was Mr. Thomas. To those who had lived in Wales all their lives, Rhondda was a household word, and those who lived farther away knew it as a wonderful place. Under the Rhondda was the finest steam coal that the world produced. The Rhondda Urban Council had a very large and difficult area to deal with. He had been asked to couple with the toast the name of Sir Walter Nicholas, who had played a great part in the opening up of the district and in the work of the Council.

Sir WALTER NICHOLAS (the Clerk to the Council) said that as one of the colleagues of Mr. Thomas, as well as a citizen of the Rhondda, he would like to say how much they appreciated the honour that had been done them by the election of Mr. Thomas as President of the Institution. He had known Mr. Thomas for a very long period, because at one time he was a Director of the undertaking which Mr. Thomas controlled before he came to the Rhondda. At Risca Mr. Thomas was held in the very highest esteem, and this esteem had not been lessened in any degree so far as the Rhondda public were concerned. Both the Council and the inhabitants knew that he was a most conscientious and most upright man. Those who lived in the

Rhondda knew it as one of the most rapidly developed and most progressive districts in the kingdom; and the Council had had a very difficult problem to solve. If for the time being they stood somewhat under a cloud, because the rates were high, it must be remembered that their rateable value was dependent upon the output of the collieries. Within the last three or four years, as a result of stoppages and other things, no less than £200,000 out of a total of £700,000 of rates had been lost through circumstances over which the Council had no possible control. No other urban council in the district had been confronted with such a difficulty; but fortunately this period of depression was passing away.

Mr. HARCOMBE, who pointed out that, though he was Chairman of the Urban District Council, he was a collier who worked at the mines, said it was a pleasure to propose the toast of "The Wales and Monmouthshire District Institution of Gas Engineers and Managers." They were all very proud of the fact that Mr. Thomas was the President for this year. Those who had listened to his address that morning would have learned something of the difficulties he had had to contend against. The Council had no officer who was more conscientious and more loyal to his duties than Mr. Thomas, whose name he coupled with the toast.

Mr. THOMAS, in reply, said he deeply appreciated all the kind things that had been said about him.

THE MINERS' RESCUE STATION.

After lunch, a specially reserved tramcar conveyed the party to the Miners' Rescue Station; and under the guidance of Mr. J. H. Thorne, the Superintendent and Instructor, they were shown over the premises, which are excellently equipped for life-saving purposes. They had explained to them by Mr. Thorne, with actual demonstrations, the working of the latest forms of breathing and resuscitating apparatus. They also inspected a gallery made to represent an underground roadway, and containing such obstacles as are likely to be met with in a mine after an accident. When training operations are in progress, the gallery is filled with sulphur before the men enter it with their breathing apparatus on. Men come to the station for training from every colliery in the neighbourhood; so that they are, of course, all practical men. Before the members left, Mr. Thorne was, on the proposition of the President, accorded a hearty vote of thanks.

VISIT TO THE GAS-WORKS.

The members then proceeded to the Ystrad Gas-Works. It may be pointed out that the Rhondda Urban District Council purchased the undertaking of the Ystrad Gas and Water Company in March, 1898, under parliamentary powers. The area of the district supplied with gas embraces the whole of the Rhondda Fawr Valley and the Rhondda Fach Valley as far as Tylorstown. There are, it may be mentioned, two gas-works, one situate at Porth at the lower end of the Valley, and the other at Ystrad 6 miles up the main valley.

At Porth, in the old retort-house, there are eight beds of seven single ⏀ retorts 22 in. by 15 in., and six beds of inclined, eight ⏀ retorts in each bed, 20 ft. long by 24 in. by 16 in., all fitted with regenerator furnaces, capable of producing 1,000,000 c.ft. of gas per day, with the necessary water-tube condensers, duplicate engine and exhauster, Livesey washer, tower-scrubbers, and four purifiers 40 ft. by 12 ft. 6 in., and a station-meter. There are two gasholders, one of a capacity of 51,000 c.ft., and the other 137,000 c.ft. In addition there is a holder at Tonypandy of a capacity of 354,000 c.ft., which is filled by means of a gas-engine and exhauster from either the Porth or the Ystrad Gas-Works.

At Ystrad there are six beds of seven single ⏀ retorts, and one bed of five retorts 22 in. by 15 in., fitted with regenerator furnaces, capable of producing 280,000 c.ft. of gas per day, with the necessary water-tube condensers, duplicate engines and exhausters, Livesey washer, tower-scrubbers, and six purifiers, two of which are 20 ft. by 20 ft., and four 12 ft. square, together with a station-meter. There are two gasholders, one of a capacity of 19,000 c.ft., and the other 134,000 c.ft. There is also a sulphate of ammonia plant at these works. A water-gas plant to produce 300,000 c.ft. per day is in course of erection. There is a holder at Treorchy, with a capacity of 100,000 c.ft., which is filled from the Ystrad works in a similar manner to the Tonypandy holder.

On the return to Porth, tea was served in the hotel, and this brought a successful meeting to a close.

Modern Coking Plant and South African Conditions.—A special correspondent of the "South African Mining and Engineering Journal" writes that the present prospects of an expansion in the South African steel industry will inevitably bring-up for discussion the coke industry and the advisability of installing more bye-product recovery ovens to replace those of the beehive and Belgian retort types. The idea is prevalent there, that the modern coke-oven recovering bye-products is not suitable to South African conditions, and that the bye-products cannot be produced on a paying basis. If this be true, that is, he says, the only country in the world where local conditions and difficulties in this respect have not been met. Or again, it is said that they are still in the embryonic stages of industrial development, and that therefore the time is not yet ripe to adopt the improved methods in daily use elsewhere. The only reply to this contention is that, had South Africa adopted this view in the early days of the gold mining industry, the country would probably not be occupying its present position in that field. He goes on to give an account of the working of bye-product ovens.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Opening Meeting of the Session.

There was a very good attendance of members at the Westminster Technical Institute, S.W., last Friday evening, to take part in the opening meeting of the Association for the new session. Mr. Frederick A. Frost, of the South Metropolitan Gas Company (the retiring President), occupied the chair during the first part of the proceedings.

Mr. FROST said he would like to remark how satisfactory it was to the Council to see such an excellent assembly of members at the inauguration of what they all felt there was good reason for hoping would be a prosperous session. He appealed to them to maintain large attendances at the meetings, which were always so encouraging to those who presented papers. The Council, too, were particularly anxious that the visits should be taken part in by as great a number of members as possible.

Mr. LEONARD LACEY (the Assistant Hon. Secretary) having read the minutes of the last meeting,

Mr. FROST said the time had now arrived for him to lay down the reins of office. He felt that the selection of Mr. Cross to succeed him as President was a most excellent one, and he would ask for him the loyal support of every member. All he had to do now was to wish Mr. Cross a happy and successful year of office.

Mr. D. CLEAVE CROSS (Lea Bridge District Gas Company), the new President, then took the chair, and was warmly welcomed by the members. He said he had received letters from two of the patrons of the Association expressing regret at their inability to be present. One was from Mr. John Terrace, and the other from his own father, who was away on holiday. He proceeded to deliver the following

PRESIDENTIAL ADDRESS.

Allow me to thank you heartily for the honour you have conferred upon me in electing me as your President. Let me assure you it is an honour I sincerely appreciate; and I feel certain I can rely upon the support of the Council and members in order that the coming year may be a fruitful one for the Association. I should like to emphasize the great benefits that may be derived by regular attendance at the meetings, and by free and open discussions. Although the subject-matter at a meeting may not be directly concerned with your department, yet I cannot overestimate the importance of broadening your general knowledge and keeping in touch with the latest improvements in all departments. It will help you in the study of your own problems. I propose in my address to touch upon a few experiences gained in connection with the undertaking with which I have been associated all my working life. Since I joined the Company 19 years ago, the works have grown in output from 216 millions to 800 millions per annum. It stands to reason the development and extension of the works have been of benefit in the experience gained by the assistants.

VERTICAL RETORTS.

Members will expect me to say a few words about the vertical retorts at Lea Bridge. In 1914, West's Gas Improvement Company, Ltd., erected four beds with eight retorts in each, and having a total daily capacity of 1 million c.ft. These were put to work early in 1915; and in 1920 two further beds were erected in the same house. The size of all the retorts are now 2 ft. 9 in. by 10 in. at the top, and tapering evenly to 3 ft. 3 in. by 18½ in. at the bottom. The total length is 21 ft. The retorts were first built of Stourbridge fireclay sections, each 2 ft. 1 in. in depth. They became a little troublesome after a while through circumstances beyond our control, and had to be partly renewed during the war. The retorts were worked under very trying conditions, and there is a probability that the constant air raids considerably shortened the life of them. In passing, I may say that during air raids we always had to shut-down our water-gas plant, and stop charging the inclined retorts. We generally managed to continue working the verticals throughout the raids; and despite our low storage capacity, we were able to maintain our full pressure and supply to the district throughout the war.

In 1918, owing to the troubles we had experienced, all the four beds were completely renewed with Derbyshire silica retorts. The floor tiles and lining were of Yorkshire silica. The retort segments were only 12½ in. deep, and the section of the retort was made up of 12 segments; and these smaller segments gave more strength to the retort than in the original design. The shape of the retort was slightly altered; the section became more elliptical instead of having practically straight sides; and the taper of the retort was also made the same throughout instead of a slight taper from the top, opening out rapidly near the bottom. These two small points have made a great difference in the smoother working of the coal down the retort. The hang-ups now seldom occur with the coal, but only with the coke just above the extracting worm. These retorts have worked quite satisfactorily, and their average life so far is 1200 days, having carbonized about 2800 tons of coal per retort, after making allowance for scurfing. About a year ago we discovered a hole in the lower part of a retort about 3 in. in diameter, and as soon as possible we shut-down the bed to repair it. Since then a few more holes have developed in other

retorts; and the opportunity has been taken to study the wear of the retorts and the best method of repairing them. All the holes develop in one of the four corners—in either the first or second combustion chamber up from the bottom, which are not the hottest combustion chambers in the bed.

The repairs were at first made by cutting away the portion of the retort round the hole and patching with small silica retort segments 4 in. in depth and 3½ in. thick. We have had an opportunity of examining these patched retorts after a winter's work; and we have come to the conclusion that it is not the best method of repairing them. It is similar to patching an old garment with a small piece of new material. The retort shows signs of weakness at the corners not previously repaired, and will not last the lifetime of the rest of the retort. After closely examining several of them, we find, after about 1000 days' life, the sides have worn in some places (more especially the corners) nearly as much as 1½ in. on the inside of the retort corresponding to the first and second combustion chambers as previously mentioned, or (say) from 4 to 8 ft. from the bottom. The rest of the retort above and below appears to be in excellent condition, and not worn generally speaking more than ½ in.

Our latest experiment has been to cut-out the whole of this weak section of the retort 4 to 5 ft. in depth, and rebuild with the special small silica segments which are easily handled in the confined space. It has been found possible to do this by dropping the coke chamber and working off a ladder from the bottom, and cutting-out a section at a time. I am optimistic enough to think that, by rebuilding this small worn portion, we can nearly double the life of the retorts. I am of opinion that the extra wear at this part is due to the effect of steaming, although we have not steamed very heavily at Lea Bridge, as may be judged by the fact that the average quality of the coal gas made by the verticals is about 505 B.Th.U. I am convinced that heavy steaming of (say) over 20 p.ct. is a mistake, and does damage to the retort.

COMPARISONS OF VERTICAL AND HORIZONTAL RETORTS.

While on the question of steaming, I would like to point out how difficult it is to compare the fuel used in vertical settings with horizontals. Several times, owing to special circumstances, we have reduced the throughput of coal per retort per day by as much as 15 p.ct., but have fully maintained, and often increased, the total quantity of gas made per day by increasing the steaming. Even with the lesser throughput of coal, the full heat on the retorts has to be maintained because of the increase in steam. The fuel used, therefore, to keep up the heats has been nearly the same. It will be seen that the fuel used per therm made may remain the same, but if calculated on the coal carbonized it will show an increase of 10 p.ct. to 15 p.ct., which is very misleading, and often conveys an impression that the fuel consumption is excessive. We work our step-grate furnaces without doors, and control by the producer and chimney dampers. The saving of fuel when we first made the change was about 6 to 10 p.ct. Our usual method of cleaning the furnaces was to withdraw the clinker from each step of the grate from top to bottom. After the excellent paper given to the Association by Mr. Thorman, we adopted the method of breaking-up the clinker on the top bars and pushing it forward into the fire, and only raking out the bottom. The result was we had 21 p.ct. less pan ash from the furnaces, and the amount of serviceable coke in the pan ash dropped from 34 p.ct. to 20 p.ct.

It has been found that any class of coal can be carbonized; but the conditions of working need to be watched and altered for every distinct change in the class of coal. It is not advisable to attempt to carbonize at the same rate of throughput, or steam at the same pressure, as, for example, when using Durham coal as compared with Yorkshire or Derbyshire nuts. The nuts travel much faster down the retort than the Durham coal, and have to be checked; also we have found the steam is allowed a freer passage through the coke with nuts as compared with Durham or slack coal, and consequently a higher percentage of water gas is made. At present coals from ten different collieries are being used; but the mixture is kept fairly constant.

A peculiarity of verticals is the formation of ammonium chloride in the collecting main and round the retort-house governors. The trouble was overcome in the foul main and governors by pumping a continuous stream of liquor through the mains up to the governor outlet; but for years we had the slow making-up of pitch and chloride at one end of the collecting main which had to be periodically taken out. This trouble has been surmounted by enlarging the liquor supply to each collecting main from a 1 in. to 2 in. pipe, and leaving the tar valves open.

It is my personal opinion that vertical retorts during the past few years have been unfairly compared with the modern horizontal settings, and too hastily condemned. Horizontal retorts are over 100 years old, while vertical retorts in practical working are young in comparison; and even with the earlier types of these new retorts, superior results were obtained from the verticals over the old type of horizontals. There has been a marked improvement in the design and working of horizontals the last few years, and they have to an extent regained their position; but I think distinct improvements in the verticals may be expected as more experience is gained of their conditions of working. Where verticals have suffered in comparison with modern horizontals is in the question of coke fuel. There is a great loss of useful heat in the waste gases, although this is partly compensated by the recovered heat from the coke, which is discharged black, and requires practically no quenching. I have long felt that when this high heat in the waste gases was recovered there was every reason to expect the total quantity of coke sold from verticals to be more than from horizontals. This conclusion, I believe, is being borne out by the more modern plants where special waste-heat boilers have been installed. In the report of the Bolton Gas Committee this year, it is stated that the special waste-heat boiler erected with their new vertical retorts at the Gas Street works is able to supply the whole of the works with steam during the summer months.

COKE HANDLING.

I am very impressed with the efficiency of the overhead telpher system for handling coke, especially from vertical retorts. The coke is drawn from the retorts into skips with bottom doors. It is black and requires very little quenching. The telpher carries the skips of coke direct from the retort-house to either the water-gas plant, boiler-house, or the coke yard. The total percentage of breeze from the coke as separated by an ordinary 14 prong fork is about 11 p.ct. We get hardly sufficient breeze out of the coke for our boilers; therefore there is none for sale. As a coke-conveyor the maintenance charges of a telpher plant are small, and it is most reliable.

BOILER FURNACES.

All our Lancashire boilers are fitted with forced-draught furnaces, having four-way firebars. After cleaning the fire, if it is fed with coke only and the forced draught turned on, the firebars are subjected to a considerable local heat. Our old type four-way bar is 2⅜ in. wide, but only ⅞ in. thick on top. There has been a fair amount of trouble at times, due to the top of the bar cracking, and sometimes burning through. About 18 months ago, the makers supplied a special four-way bar, which has so far proved very satisfactory. The bar is only 1½ in. wide, and considerably stronger on top. There are 36 bars in each furnace. A new feature is the addition of two baffle-plates ⅜ in. thick to partly check the airways. These are placed after the 12th and 24th bars, dividing the furnace into three sections. The usual tendency of a forced-draught furnace is to give a greater volume of air through the bars at the back than at the front. We find these baffle-plates check the forced draught. After experimenting with different sizes, we now obtain, as indicated by a wind gauge, a perfectly even distribution of air over the whole of the top of the furnace. The result has been a distinct increase in efficiency of the boiler, and less fuel used as compared with the old type bars.

WATER GAS.

During the last 2½ years, our carburetted water-gas plant has been completely reorganized. We had two 500,000 c.ft. sets, and a one million set, with two old 55 H.P. turbine blowers. One of the small sets was pulled out and replaced by a 1½ million set, and at the present time the second 500,000 c.ft. set is being replaced by a 1¾ million set. This latter extension is being carried out to delay the expenditure of capital on new retort plant. We have also installed two additional 75 H.P. turbine Sturtevant blowers. The only novel feature about the new plant is the erection at the present time of a waste-heat boiler to be connected to both the large sets, and having one auxiliary stack (adjoining the boiler) common to both sets. As the boiler cannot conveniently be worked by the two sets at the same time, there are provisions for blanking-off the different branches by means of sliding plate gates. The locking gear on each set is connected to the auxiliary stack through two shafts, which can be coupled together when necessary. It will be a simple matter to work either set alone with or without the boiler. We are hoping to keep the boiler always in use, and work it with the set that is in action. We have had to erect a water-softening plant in conjunction with this boiler, as we use only our own well water on the works. It will interest members, when they visit Lea Bridge next April, to see the ingenious way in which Messrs. Humphreys & Glasgow, Ltd., have fitted the larger set and the boiler into the space originally occupied by a 500,000 c.ft. set.

In the early days of our water-gas making about 14 years ago, we had considerable trouble with light oils coming forward with the water gas into the oxide purifiers. I can remember the time when the oxide was of no use except as a good substitute for asphalte for paths. This difficulty was completely overcome at the time by the introduction of a Pelouze tar-extractor. We have since outgrown this Pelouze, and began again to get light oils forward in the purifiers. At the end of last year we erected an old two million Livesey washer in place of the Pelouze, and it has been very successful. Our purifiers are now free of all traces of oil, and are lasting more than twice as long as before changing.

HOLDER STORAGE.

One of our chief anxieties at Lea Bridge is the shortage of gasholder storage. Our maximum 24 hours output for the past nearly three years has been just over 3 million c.ft., whereas our utmost storage capacity is 1,130,000 c.ft., which is only 36 p.ct. of the maximum output. On a fine summer Sunday our mid-day cooking load is very heavy; the greatest hourly consumption is often over 300,000 c.ft., which is 27 p.ct. of our total storage. This entails always having to keep a reserve of manufacturing plant in action. We have recently commenced excavation for a new 2½ million c.ft. gasholder; and I hope members will have a good opportunity to inspect the erection when visiting Lea Bridge.

LUBRICATING OIL.

I would like to say a few words on the subject of lubricating

oils used on the works. We have given this a good deal of attention. Just over two years ago we started a new oil stores with a part-time oil man, and placed the complete control and supervision under one of the technical staff. A record was started, and is still kept, of the daily quantity of all grades of oil used in every part of the works, and this is entered in a specially tabulated book. Wherever possible the waste or used oil is collected, and returned daily to the stores, where all the different grades are separately filtered. When the consumption of the different grades of oil are carefully watched, it is surprising the amount of saving that can be effected. We do not use this recovered filtered oil again for our main engines; but there are numerous places where it can be employed—such as for the coal plant, bogie wheels, retort-house, and fitters' shop—in place of new oil. This closer attention to the oil consumption automatically causes the workmen to be less wasteful. The following table shows the total consumption of oil (including turbine oil) on the works during the last seven years; and the recent great saving will be noticed.

TABLE.

Year.	Total Gas Made.	Total Oil Used. Gallons.	Gallons per Million Cubic Feet Made.
1916	537,007,000	3258	6·06
1917	629,463,000	3819	6·06
1918	645,489,000	4663	7·22
1919	730,498,000	5651	7·73
1920	779,014,000	4397	5·64
1921	785,566,000	3976	5·06
1922 (9 months)	590,016,000	2716	4·60

Having obtained all the data we required during the last year, we entered into a contract in January for the supply of all the lubricating oil we may require on an "output of gas" basis, paying a fixed price per million cubic feet of gas made each month. All the calculations were made on last year's oil consumption. For every gallon of new oil saved this year as compared with last year, we shall receive a credit at the end of the year at a fixed basic rate per gallon. Everything is calculated on the gallons used per million cubic feet of gas made. There are several advantages under this new form of contract, including the advice of the Oil Company's Engineers, who periodically visit the works, and the loan of mechanical lubricators and filters. The reason I have mentioned this subject of oil is because I am convinced it does amply repay the very closest attention.

ENCOURAGEMENT TO JUNIOR GAS ASSOCIATIONS.

I would now like to mention two small matters which concern all the Junior Gas Associations of England. We have been encouraged by the sympathetic help given to us by the senior engineers of the gas industry. We do feel our progress is keenly watched; and it has been kindly acknowledged that we are live and active bodies. But there is a further step of recognition I should like to see, and a closer affiliation between the District Junior and Senior Gas Associations. At present each District Senior Association is affiliated to the Institution of Gas Engineers, and each district I believe is invited to send a representative to the Council of the Institution. I would respectfully suggest to the District Senior Associations that this same principle be extended, and a closer relationship exist between the two Associations in each district, by sending an invitation to the juniors to nominate a representative to their council. I feel sure this would be much appreciated and be beneficial to both.

My second point concerns the individual members. Our Association has often expressed great appreciation of the way gas companies have thrown open their works for our inspection, and always given us a most hearty welcome. I would, with all due deference, like to make the following earnest appeal to directors and general managers of gas companies. A young assistant or superintendent very keen to get on and keep in touch with all the latest improvements and modern practices, will become a member of the Junior Gas Association, the Institution of Gas Engineers, and also possibly the District Senior Association, as well as providing himself with the latest technical journals, and attending the visits of the Associations. He finds all this a severe tax on his pocket. The Junior Associations of England have a very powerful influence on the technical education of their members. It would be a help to the Associations, and be a blessing to the individual members, if the companies would assist the junior members of their staffs in some material way to meet these expenses, and thus exhibit a practical help and encouragement to their juniors to become as efficient as possible.

CONCLUSION.

In conclusion, as a young man I would like to offer a word of advice to other young men of our profession who are just starting. Having had nine years' experience at evening classes, I am a strong believer in the great benefits that can be gained by working hard at these classes for at least the first five or six years of training. During your studies and technical reading, you will often come across important tables and formula that may be of value to you some day. Start at once collecting this data, either in a loose leaf book or in a filing system similar to that explained by Mr. J. Terrace (Chief Engineer of the South Suburban Gas Company) to our Association in April, 1921. There is a nice sense of philosophy in the old saying concerning "the last straw that breaks the camel's back," but probably much harm has been done by this wise saying being taken too literally. Fearing the awful fate of the camel, men go about all their lives refusing to take any heavier loads on their shoulders, seeing in each new task the deadly weight that will cause their breakdown. To them, each straw seems the very last one, and every straw a heavy one. Shoulder your load. You were not given a spine for nothing. More backs are broken by the dread of a load than the weight of it.

Mr. FROST said they had had a most encouraging address. Anything that emanated from Lea Bridge with regard to the working of vertical retorts must be treated with a great deal of respect. There were many other points in the address well worthy of note. One thing which particularly impressed him was the reference to lubricating oils. It was not often the gas industry discussed such subjects; but only a few days ago he was talking over the matter with a gentleman connected with oil, who told him he was able to declare with certainty that within the London area the gas companies alone spent a sum of money on lubricating oils that ran into six figures. It was therefore apparent, with the heavy price one had to pay for oil, that careful attention to this matter would be well repaid. It was quite true that people who entered the gas profession had to spend a good deal of time and money in order to progress; but a point which would be of interest to some of them was that he thought the Income Tax officials had agreed to make an allowance in respect of expenditure on books, drawing instruments, attendance at classes, and other things to enable them to get on.

Mr. W. GROGONO (Gas Light and Coke Company), in proposing a hearty vote of thanks to the President for his address, said that what they had heard would be invaluable to them in connection with their visit to the Lea Bridge Gas-Works later on in the session. One thing that had struck him was the reference to chlorides in ammonia. This was a thing very near to every gas man's heart at the moment. To the best of his belief, it was the one thing that was stopping their getting complete separation of tar and liquor. Mr. Cross had given them a detail address on works. The juniors were detail men, and so he had been very wise in the choice he had taken.

Mr. W. NEWTON BOOTH (Woolwich Arsenal), in seconding the resolution, which was heartily carried, said both Mr. Cross and the Association were to be congratulated upon the address. It was, as had been remarked, just the sort of address for a Junior Association, whose members were particularly concerned with details. Attention to details fully repaid the cost and trouble it entailed. The gas industry was built on its staff, who were the bricks; and it was up to every brick to see that it was a good, square, hard brick. As to the "last straw," a man with a backbone could carry a good load; and the more he carried the more he was worth.

The PRESIDENT said he felt it a great honour to be at the head of one of the most active bodies connected with the industry. It should be the ambition of all to reach the chair.

A PRESENTATION.

The PRESIDENT said it was now his pleasure, on behalf of the Association, to ask Mr. Frost to accept a framed illuminated address, as a small token of their great esteem for him, and a slight acknowledgment of the excellent services he had rendered to the Association. He had been one of the most zealous members, and last year he had made a first-rate President. The address was as follows:

> This testimonial is presented to Mr. Frederick A. Frost, by the Council and Members of the London and Southern District Junior Gas Association, as an expression of their sincere esteem and great appreciation of the earnest work accomplished by him during his year of office as President, 1921-1922, and also previously as Hon. Treasurer. His high ideals, together with professional knowledge and great devotion to duty, have still further enhanced the reputation of the Association in our industry. The members tender their heartfelt and grateful thanks, and express sincere wishes for a continued successful career.
>
> President, D. Cleave Cross.
> Hon. Secretary, George Winslow.

He hoped Mr. Frost would accept it in the spirit in which it was offered.

Mr. FROST thanked them all heartily for the handsome way in which they had shown their appreciation of his services to the Association, of which he had been a member for something like fourteen years. He strongly felt that anything he might have accomplished repaid only in a very inadequate manner the debt that he owed the Association. Whatever he had been able to do as President was because of the unanimous and whole-hearted support of the Council and members, and particularly of the Hon. Secretary.

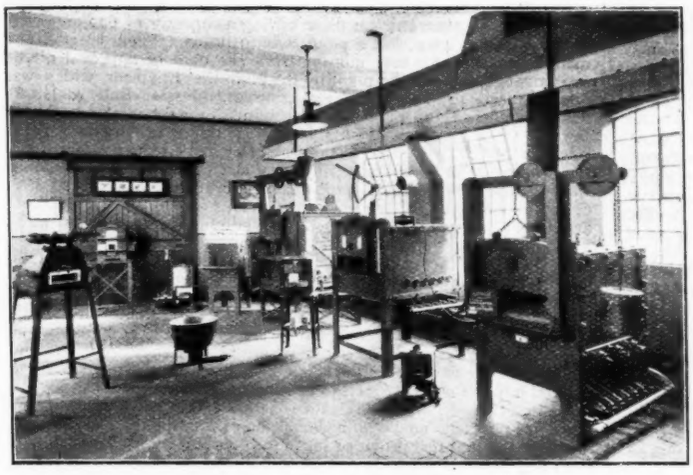
A batch of new members were introduced, and then light refreshments were served.

British Cast-Iron Research Association.—The annual meeting of the Association will be held in November, when some important alterations in the rate of subscription will be made. The election of the Council will also take place. Under the new scheme arranged, the Council will be representative of every foundry district. The country has been plotted into sixteen districts, each area sending one member to the Council for every 100 foundries in that area.

THE INDUSTRIAL GAS DEMONSTRATION ROOMS AT BIRMINGHAM.

It is well known that for a number of years the Birmingham Corporation Gas Committee have used every possible means of extending the use of gas-furnaces in the Birmingham area of gas supply, thereby increasing their industrial load. There has been in existence a section of the Department devoting itself entirely to experimental work in connection with the many and varied industrial problems brought before it by consumers, and also investigating channels whereby experimental work carried out might bring new business.

This section has had headquarters at the Council House and demonstration room, foundry, and stores situated at the Windsor Street Works of the Department. The need for centralization and increased publicity work has long been felt; and after difficulties of obtaining suitable premises, demonstration rooms have been prepared in a building in one of the main thoroughfares of the city, where industrial gas-furnaces and apparatus of a like nature are available for demonstration to anyone interested, and the use of gas for industrial purposes is being continually brought before the public. Three rooms in the building have been allotted to this purpose. There is a ground-floor demonstration room, with windows, in which several furnaces have been arranged; the second floor room is being used for the smaller type of apparatus; and a third room is employed for the demonstration and testing of the larger and high-temperature types of furnaces.



A Section of No. 1 Demonstration Room.

The following is a more detailed *résumé* of the various furnaces and apparatus available for show and demonstration.

No. 1 Demonstration Room.

This room is divided into two sections—the one with the window frontage being used for showing several types of tool-hardening furnaces and oven furnaces, as detailed in the following list:

Small oven furnace (natural draught).
" " " (gas and air blast).
" " " HS.1 (gas and air blast).
Twin chambered high-speed steel furnace (gas and air blast).
" " " " " No. 1.
Oven furnace (high-pressure gas).
Rivet heater (high-pressure gas).
Lead melting pot NL.15 (natural draught).
Soldering stoves (high and low pressure).
Blower.
No. 3 "Empire" blower.

The other section of the room is devoted to a series of natural draught gas-heated oven furnaces; and the following particular furnaces are on show:

Oven furnace (natural draught).
Oven furnace (natural draught).
Oven furnace, NO. 120 (natural draught).
Oven furnace, NO. 10 (natural draught).
Oven furnace (natural draught).

No. 2 Demonstration Room.

A double-cased stove, packed with silicate of cotton and heated by natural draught gas-burners, is shown and recommended for core drying, japanning, and drying work generally. Particular attention is paid in this room to the requirements of the jewellers; several well-known types of muffle furnaces being installed for jewellers' work—*i.e.*, annealing of gold and silver, enamelling, &c. Several sizes of blowpipes are also shown. Gas-heated furnaces for melting of gold and silver, both of the natural draught and air blast type, are also fixed.

The tin-plate trade is catered for with samples of stoves supplied by well-known makers for the heating of soldering irons and also self-heated soldering irons. A number of different types of natural draught and air blast burners are also available for demonstration to anyone particularly interested in special work which is often brought before the Department.

The following is a detailed list of the apparatus installed in this room:

Japanning stove.
No. 6 muffle furnace.
N M. 10 muffle furnace.
N M. 7 muffle furnace.
Small high-pressure oven furnace.
Glue-pot heater.
Various blowpipes (air blast and high pressure).
Soldering stoves.
Self-heated soldering irons.
"Lecture furnace."
N C. 3 melting furnace (natural draught).
6054 " " (air blast).
Gas and air mixer.
Air-blast burners.
Various ring burners, &c.
Bellows.

It might, with interest, be mentioned that, in each of the demon-stration rooms referred to, a special gas-meter has been fixed, and all furnaces, stoves, &c., are connected to a main rail fed from this meter; and it is possible to give an interested consumer full particulars of gas consumption, &c., of the particular apparatus in which he is interested.

No. 3 Demonstration Room.

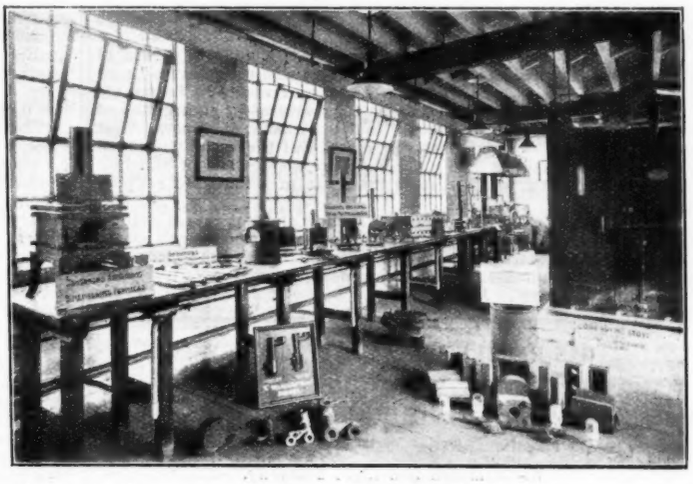
The following is a list of apparatus installed in this room:

Refrigerating plant.
Tube-brazing furnace.
Sugar-boiling "
60 lb. melting "
Davis "Revergen" (framework).

Two sugar-boiling furnaces have been specially erected for test purposes. A melting furnace for brass, gun metal, &c., and furnaces for brazing brass and steel tubes. It is also intended to instal a "Revergen" furnace for demonstrating the latest types of recuperative furnaces, which are becoming more widely used for this class of work.

It is interesting to note that a gas-heated refrigerating plant, as supplied by the British Refrigerating Company, is also installed in this room, and has been demonstrated to a number of people who have need to make use of such plant in their shops, &c. Experiments are continually being carried out here with new types of apparatus which are brought to the notice of the Department from time to time.

In addition to these demonstration rooms, ample stores and office accommodation have been arranged.



No. 2 Demonstration Room.

Safety Chains for Track Hoppers.—Guards extending above the track level to keep people from falling into track hoppers have to be removed when the cars are placed over the hopper. Further, they do not, says Mr. J. W. Batten, of the Detroit City Gas Company, protect against men working in the cars falling through the car dump openings. Such accidents have happened at his Company's plants in the past; two employees having been killed by being drawn into the crusher. Consequently the track hoppers have now been equipped with safety chains placed about 12 in. apart and extending lengthwise. The chains swing aside to allow large lumps of coal or coke to pass, and each is attached to a coil spring at one or both ends.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

"Cutting" Prices in the Gas-Stove Trade.

SIR,—Interested as I am to-day in the prices at which gas-consuming appliances can be purchased, in view of the fact that it is to the consuming end that we have to look for an expansion of business, I have been hoping that you would have drawn attention to a remark made by the Rt. Hon. T. M'Kinnon Wood, in his speech to the shareholders of Messrs. Glover & Main, Ltd., at their recent annual meeting.

I ought perhaps to preface what I have to say with the remark that I have not a penny piece invested in any one of the gas-stove companies; but I am interested in a fairly large gas undertaking that buys goods from Messrs. Glover and Main, and from certain of the firms constituting Radiation, Ltd. This shows disinterestedness; but I do believe in honour being given where honour is due. Perhaps unconsciously, the Chairman of Messrs. Glover and Main has given honour where it is due, and has helped to clear away the ill-forebodings that possessed some of us when several of the gas-stove companies combined to form one large concern.

Radiation, Ltd., told the gas industry that amalgamation would result in certain economies, would enable concentration on scientific research with the view to producing goods of higher efficiency, and so forth. This was all at the time somewhat vague. But it has come to pass; and what they have done has, in my opinion, had an excellent effect in stimulating enterprise in other quarters. That is all to the good. But at the time of the fusion, certain fears existed. Anything that has the appearance of a "trust" or "ring" is something that is looked upon with much disfavour and question on the buying side of the industry. We said quietly among ourselves—sometimes openly—"What of future prices?" The Rt. Hon. M'Kinnon Wood, in the "JOURNAL" for Oct. 4, neatly supplied the answer. He said: "In the stove trade, they had had to compete with a large combination; and there had been keen cutting of prices."

We as gas men want lower prices; and therefore I, for one, think it only right we should now acknowledge that our fears were groundless, and that promises are being faithfully redeemed. We hope to see prices lower still; these will no doubt come with a further improvement in manufacturing conditions. One means of improving those conditions is to increase sales; and price is an important factor in this regard.

While writing, might I ask the gas-stove firms if they would arrange to give consumptions not only in cubic feet, but in B.Th.U. Consumptions expressed in "cubic feet" have not much meaning to-day with declared values per cubic foot running from 400 to 560 B.Th.U.

Oct. 25, 1922. THERM.

Criticism of the Therm.

SIR,—Poor little therm! Still, is it not natural that at its inception—like the introduction of anything new (advantage notwithstanding)—it is bound to be adversely criticized as something revolutionary? One wonders how many of those outside the gas industry ventilating their spleen about the therm know what it really is. Can it be anything more mysterious to them than the cubic foot—for what, in fact, do they know of that? The gas-meter was ever a victim of satire. Was it not years ago commonplace to say of one whose veracity was much in question, "He lies like a gas-meter"?

Let us ask, What kind of reception would a uniform system of *weighing* of commodities be likely to receive where "measure" now prevails? Yet would not weight be the fairest measure? To me the purchase of fruit and vegetables by liquid measure—(*e.g.*, a gallon of apples or potatoes)—is ludicrous. And the retailer tells us we "get more that way!" To go into the vagaries of the various terms of weights and measures and their different application in different localities, I believe, would require the space of a fair-sized encyclopædia.

When the newspaper bogey, as the shadow and not the substance, no longer haunts the mind of the intelligent consumer, he will sooner or later realize the truth of quality *versus* quantity, and the therm will doubtless be commended rather than condemned.

Oct. 26, 1922. "NEMO."

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" regarding applications to the Board of Trade for Orders under the Gas Regulation Act.

Northampton Gas Light Company.

The maximum prices now authorized in respect of the supply of gas by the undertakers are 5s. per 1000 c.ft. in the county borough of Northampton, and 6s. in any other part of the limits of supply; and the prices they have asked the Board of Trade to substitute for these are 1s. 6d. and 1s. 8·5d. per therm respectively.

DECLARATION OF CALORIFIC POWER.

Northfleet and Greenhithe Gas Company, Ltd.—450 B.Th.U. (Dec. 1.)

Coke-Oven Gas at Chesterfield.—The Chesterfield Corporation are to discontinue their present agreement with the Grassmoor Company for the supply of coke-oven gas, and to substitute a new agreement, which provides that the price per 1000 c.ft. shall vary in proportion to the variation from time to time in the price of screened gas coal—such arrangement to be for three years.

LEGAL INTELLIGENCE.

THE TULLY GAS PLANT—CONTRACT LITIGATION.

The action of the *Grays and Tilbury Gas Company v. Tully Gas Plants, Ltd.*, the hearing of which occupied the attention of Mr. Justice BRANSON for several days, was concluded on Tuesday of last week.

Plaintiffs claimed damages for alleged breach of contract to supply and erect upon their premises at Grays a Tully carburetted hydrogen twin generator gas plant, and a declaration that they were entitled to have the plant dismantled and removed at the defendants' expense. Plaintiffs also sought to recover all sums which they had paid to defendants in respect of the plant. By a contract in writing of March 12, 1920, Messrs. Bale & Hardy, Ltd., agreed to sell and deliver to the plaintiffs, and erect upon their premises at Grays, a Tully carburetted hydrogen twin generator gas plant having a capacity of 600,000 c.ft., at the price of £4100. The plant was to be completely erected and made to work within four months from the date of approval of the final arrangements of the plant by the plaintiffs' Engineer, which was upon March 12, 1920. By the contract, Messrs. Bale & Hardy guaranteed that the plant would produce in 24 hours' continuous working, with materials of suitable quality, not less than 600,000 c.ft. of gas of 425 B.Th.U., and at the rate of 45,000 c.ft. per ton of fuel; the production to be obtained during a test of 24 hours' continuous working after the necessary preparatory working. Well-forked coke or coal of suitable quality was to be provided for the test, and allowance made for any moisture, ash, and sulphur in excess of 6 p.ct., by deducting such excess percentage from the volume of gas specified above, and that the gas produced during the test should not contain more than 12 p.ct. of inerts, and should not exceed 4·5 p.ct. of CO_2. Subsequently, by arrangement made by and between Messrs. Bale & Hardy, Ltd., and the defendants, all the rights and liabilities of Bale & Hardy, Ltd., under the contract were acquired and assumed by the defendants, who agreed with the plaintiffs that they were liable to them under the contract in the same manner as if the defendants had entered into the contract instead of Messrs. Bale & Hardy, Ltd.

Plaintiffs alleged that defendants had broken the contract, in that the plant was not completed within the period of four months, and was not ready for the first test provided for in the guarantee until March, 1921, and upon the tests being carried out on March 21, 22, and 23, they resulted in the plant failing to comply with the guarantee in the following respects: The quantity of gas produced was 24,000 c.ft. per 24 hours less than the guaranteed quantity of 600,000 c.ft.; the quality was only 271 B.Th.U., as against the guarantee of 425 B.Th.U.; and the CO_2 was 8·6 p.ct., as against the guarantee of not more than 4·5 p.ct. By reason of the above, plaintiffs alleged that they were entitled to claim and recover from defendants damages for breach of contract. About April 22, 1921, it was further agreed that, in consideration of the plaintiffs allowing defendants further time, and permitting them to carry out certain alterations which defendants desired to make to the plant so as to enable it to comply with the guarantee, the defendants agreed, at their own expense, to carry out the alterations and have the plant complete and ready for running by May 31. In the event of the plant not complying with the guarantee after the alterations had been carried out, they agreed to remove it at their own expense, and to refund the plaintiffs all payments made by them in respect of the plant. Defendants accordingly proceeded to carry out the alterations, which were completed about July 12; but the plant failed to comply with the guarantee in the following respects: The quantity of gas produced was 90,000 c.ft. per 24 hours less than the guarantee of 600,000 c.ft.; the quality was only 342·4 B.Th.U.; the CO_2 was 5·1 p.ct.; and the total inerts were 14·3 p.ct., as against the guarantee of not more than 12 p.ct. Plaintiffs thereupon requested defendants to remove the plant; but they had failed to comply with this request. Plaintiffs said they had paid sums amounting to £3703 9s. 5d. to defendants; and this amount they sought to recover. By reason of defendants' alleged breach of contract, plaintiffs further said they had lost £49 1s. 6d. expended by them in putting in foundations for the plant, and also £250 which they had spent in connecting-up the apparatus to their own gas plant, and since July they had been deprived of the use of an efficient gas plant on their premises.

By the defence, defendants admitted the contract, and that it was not completed within four months; but they did not admit that it was not ready for the required test until March. They also denied that they had committed any breach of contract, and said it was provided by the contract that the time of completion should be subject to delays beyond their control, that the carrying-out of the work should be subject to usual strikes and accident clauses, and they were prevented from carrying out the work by matters beyond their control—viz., inability to obtain delivery of materials from the manufacturers. They denied that the plant as completed failed to comply with the guarantee, or that plaintiffs were entitled to the declaration claimed, or to reject the plant, or to have refunded the amounts paid. They also denied that plaintiffs had suffered any damage by reason of any alleged breach. Defendants also pleaded that since the tests were made in July the plaintiffs had in fact accepted the plant and appropriated it to their own use by operating and using it for their own purpose.

Mr. SCHILLER, K.C., and Mr. FRANK PHILLIPS appeared for the plaintiffs; Sir ARTHUR COLEFAX, K.C., and Mr. B. CRAIG HENDERSON for the defendants.

Many witnesses were called on both sides, including Mr. *A. W. Sumner*, Mr. *J. H. Hornby*, and Dr. *W. Brown Davidson* for the plaintiffs, and Mr. *J. Tully*, Mr. *C. H Chester*, Mr. *E. Barber*, and Mr. *Cornelius Tully* for the defendants.

His LORDSHIP, in giving judgment, said the plaintiffs sued upon a contract made with the defendants' predecessors for the installation of a carburetted hydrogen twin generator gas plant, according to a specification and subject to a guarantee; their case being that the plant, as erected, was incapable of doing the work it was supposed to do. This fact having been demonstrated on the running of the plant

in March, the defendants agreed, in consideration of being allowed to make certain alterations and the time being extended, that if the guaranteed result was not obtained they would remove the plant and repay the sums which plaintiffs had paid. The main point was, What was the guarantee? It was that the plant would produce in 24 hours' continuous working, with materials of suitable quality, not less than 600,000 c.ft. of gas of 425 B.Th.U. This raised the question as to what was the meaning of the expression "with materials of suitable quality." *Prima facie* it meant that the materials suitable were well-forked coke or coal of suitable quality; and if it had been intended that any other material, such as oil (as defendants contended), was to be used, one would have expected the guarantee to mention oil. He thought the reference to oil was an after-thought on the part of defendants; and, as a matter of construction, he found that the results were to be obtained simply from coke or coal. The fact that plaintiffs had made use of the plant in November did not deprive them of their right to relief, as before that date it had been definitely rejected, and should have been removed by defendants. Plaintiffs were entitled to the declaration claimed—that the plant should be removed by defendants at their own expense, and for repayment of the sums paid.

Judgment was entered for plaintiffs for £3700, with costs.

Stoker's Action Against a Gas Company.

At the Ludlow County Court last week, before His Honour Judge Ivor Bowen, K.C., Alfred E. Moore, a gas stoker, sued the Ludlow Union Gas Company, Ltd., for £3 10s., being one week's wages in lieu of notice, and 5s. improper deductions from wages. His case was that he was given a week's notice on Friday, March 10, but when he presented himself for work the next day found another man in his place. He attributed his dismissal to his having sent a letter to the Directors stating the men's grievances, and complaining because a deduction of 2s. 6d. a week had been made without notice. Mr. John H. Dean, the Gas Manager, said he paid Moore £3 5s. 6d. for the previous week's work, and he did not complain of any deduction. On the Friday he gave him a week's notice, when Moore intimated that he did not know if he would be at work the next day. Wanting to make sure that some one was in the stokehole, witness told another man to be there, in case Moore did not turn up. Moore, however, came in, and when asked to do some other work instead of stoking, assumed a threatening attitude, and witness had to go to the police for protection. While the police were there, he paid the man £1 14s. and 9s. 4d.; and he did not then complain of not having received enough back pay. Judgment was entered for the defendants, each side to pay its own costs.

Radiation Gas-Grates.

The Liverpool Gas Company on the 24th of October arranged an interesting lecture to their staff, and this was given by Mr. Frank Harvey, of Radiation Ltd. The lecture was illustrated by a fine series of lantern slides, and also by a novel mechanical device designed to show the working of the Radiation Patent "Injector-Ventilator." Selected models of the latest pattern gas grates were exhibited in action, and their suitability for varying requirements explained. Some very interesting points met with in fitting were discussed by the lecturer, and reference was also made to the problem of maintenance costs. In this connection, it was pointed out that the gas-grates under review were in all cases standardized, as regards their working parts, not only throughout each of the attractive series, but also throughout all the latest pattern gas-grates made by the associated Radiation firms. Moreover, the "Thermo XX" radiant now supplied by Radiation Ltd. is in one piece only, obviating the necessity for the hitherto usual separate top-portion, and reducing the cost of maintenace in this respect.

Fire at the Cirencester Electricity Works.—A fire at the electricity works at Cirencester (arising from a cause unascertained) resulted in several thousands of pounds damage. The power station was a practically new building, equipped with some of the most up-to-date machinery. There were several sets of generators and batteries at the works, and two of them are totally disabled; but thanks to the promptitude of the local fire brigade, a practically new set was saved. The staff was able to remove a quantity of inflammable oils from the zone of the fire, and so avoid explosions and greater conflagration. The lighting service was partially restored on the following day.

Prestatyn Gas-Works Extensions.—The question of the provision of new works was referred to at a meeting of the Prestatyn Urban Council last week, when it was stated that, at a previous meeting of the Council, a report was presented dealing with the necessity for extensive additions and improvements, including a new holder, retort-house, and railway siding. A resolution was passed agreeing to an application to the Ministry of Health for sanction to raise a loan to defray the cost of the works, together with the provision of a new governor and distributing mains. Mr. Williams, in submitting the resolution, said the proposed works were needed to ensure the satisfactory working of the undertaking, especially at the height of the season. The railway siding would mean a very considerable saving to the ratepayers in the cost of cartage.

South Suburban Gas Company's Lectures.—A series of lectures on "The Gas Engine: Its History, Construction, Working, and Maintenance," will be given by Mr. W. A. Tookey, M.Inst.Mech.E., in the Livesey Hall, at the South Suburban Gas Company's works on Wednesday evenings, Nov. 1, 8, 15, and 22. Admission will be by tickets, which can be obtained free of charge; and those attending three lectures will be eligible to compete for prizes for the best answers to questions set by Mr. Tookey at the conclusion of the lectures. The lectures will be illustrated by lantern slides, and are intended to provide all whose duties bring them in touch with gas engines with useful information and hints on the running and maintenance. The chair at the opening lecture will be taken by Mr. Charles Hunt, M.Inst.C.E. Arrangements are being made for short courses of lectures on other subjects early next year.

MISCELLANEOUS NEWS.

GAS COMPANIES' PROTECTION ASSOCIATION.

The Twenty-Fifth Annual General Meeting of the Association was held last Thursday, at Caxton Hall, Caxton Street, Westminster, under the chairmanship of Dr. CHARLES CARPENTER. The register of attendance showed that the membership was represented on the occasion by the following gentlemen: Messrs. G. Stevenson, R. W. Edwards, W. Stanford, J. Ferguson Bell, S. C. Sherrard, W. F. Whittaker, A. E. Johnson, George Clarry, C. F. Botley, D. H. Helps, W. A. Scott, W. E. Free, J. L. Garrard, and H. T. Mainwaring.

The SECRETARY (Mr. F. E. Cooper) read the notice convening the meeting and also the minutes of the last meeting, which latter were duly confirmed. He also mentioned that letters regretting inability to attend had been received from Messrs. Anderson, George Andrews, and Phillips. Arising out of the minutes of the last meeting, he said he had received a letter from the representatives of the late Mr. Patterson thanking the Association for the vote of condolence that was passed. As instructed at the last meeting, he had written to Mr. Honey, the Director of Gas Administration, and received a letter back from him expressing his thanks for the tone of the Association's communication.

ANNUAL REPORT.

The annual report of the Committee was as follows:

The Committee herewith present the revenue account and balance-sheet, together with a report of the proceedings of the Association for the year ended Sept. 30, 1922.

The ascertained expenditure amounted to £480 4s. 10d. The revenue was: Subscriptions £537 1s. 6d., income-tax refunded £23 5s. 9d., interest on War Loan £198 2s. 9d., amounting together to £758 10s., leaving a surplus for the year of £278 5s. 2d. From the balance-sheet it will be seen that the assets amount to £1613 4s. 2d., consisting of £1450 5 p.ct. War Loan, 1929-1947, at cost of £1377 10s. (the value of which at the date of this report is £1452 14s. 4d.), balance at bank £129 18s. 7d., and cash in hand £5 15s. 7d. In pursuance of a resolution of the Committee, £3186 10s. 5d. War Loan (1929-47) has been sold at par. The amount realized, £3177 19s. 5d., after paying brokerage and stamps, was sufficient to pay off the temporary loan from the bankers (£2925) and the overdraft, with the exception of £52, which has since been liquidated out of revenue. The profit on the sale of the £3186 10s. 5d. War Loan was £150 15s., which amount has been carried to a reserve fund.

The Executive Committee watched the proceedings in Parliament on the Trade Facilities Bill; and as soon as it was ripe for Royal Assent, issued a circular, accompanied by a questionnaire, to the members, in order to ascertain to what extent members were likely to avail themselves of the benefits of the Bill when it became law, with a view to the Association possibly making representations in the matter in the proper quarter. The result of the inquiries was communicated to the Treasury, from whom the procedure under the Act was ascertained, and subsequently members desirous of availing themselves of the benefits of the Act were advised by the Secretary as to the course they should pursue.

The question of the payment of back dividends by sliding-scale companies was considered by the Committee, as they were of opinion that it would be advantageous both to companies and to consumers if sliding-scale companies were allowed in future years to make up the deficiency where in a past year such a company had paid less than its authorized dividend. A circular letter was sent out to members recommending that sliding-scale companies applying for Gas Acts or Special Orders under Section 10 of the Gas Regulation Act, 1920, would be well advised to include in their Bills or Special Orders a provision empowering them to pay back dividends.

In January, on the instructions of the Chairman, telegrams were sent to the members desiring to know whether they regarded with favour or disfavour the proposed duty of one-third value on imported German hard glass. The replies which were received were synopsized; but as they were about equally divided *pro* and *contra*, it was felt that no action could be taken.

The question of the continuation for a further period of the special allowance for depreciation of gasholders, &c., was considered by the Income-Tax Sub-Committee, who decided that it would not be advisable that the special allowance should be continued, and that there was reason to think that even if it were asked for the Board of Inland Revenue would refuse it. The Sub-Committee further decided that if any special case of necessity for a continuation of the allowance were brought before them they would take it up with the Board of Inland Revenue if the Sub-Committee saw their way to justify the application. The matter was reported to the Executive Committee, by whom their report was adopted. The Income-Tax Sub-Committee also considered the proposal of the Board of Inland Revenue that the Association should pay income-tax on its annual surplus over expenditure, and in consideration thereof that the subscriptions to the Association should be allowed as a trade expense and not be subject to income-tax. In accordance with the recommendations of the Sub-Committee the Committee entered into an agreement with the Board of Inland Revenue, the arrangement to take effect for the year 1922-23 onwards. Members were duly notified of the arrangement by circular-letter.

With a view to increasing the membership of the Association, a circular-letter, signed by the Chairman and accompanied by a copy of the report of the last annual general meeting, was issued to members asking their assistance in obtaining fresh subscribers, and also to non-members inviting them to join the Association, with the result that 18 companies joined the Association during the past year.

A joint memorial of organizations representing public utility undertakings in favour of continuing the exemption of public utility companies from the Corporation Profits Tax under the Finance Act, 1920, was settled and signed by the Chairman of the Association and forwarded to the Chancellor of the Exchequer. This, coupled with other steps taken in the House of Commons at the instance of the Association and the other organizations above referred to, contributed largely in defeating the opposition to the exemption. Under the Finance Bill as it received the Royal Assent, the exemption is continued until Dec. 31, 1925.

In November last, the Executive Committee had under consideration an intimation received from the Board of Trade to the effect that the Board were not at present prepared to grant Special Orders under Section 10 of the Gas Regulation Act, authorizing the adoption of "Basic Dividend" provisions in accordance with the precedents created by Parliament in the cases of the South Metropolitan and other gas companies. A circular-letter was issued to members to ascertain whether they approved the basic

dividend principle, and considered it desirable that the Board of Trade should grant Special Orders containing such provisions, the object of the inquiry being to support the Executive Committee in making representations to the Board of Trade upon the matter, which was done in due course.

The revised draft Regulations proposed to be made by the Home Secretary *re* the Factory and Workshop Dangerous and Unhealthy Industries were submitted to the Committee for their observations thereon by the Home Office. The Chairman, at the request of the Committee, interviewed the Home Office upon the matter. Certain modifications were subsequently made therein in the interests of the gas industry.

Among other matters that have been considered by the Committee and the Sub-Committees at their meetings during the past year may be mentioned: The insistence of the Gas Referees on the use of the Boys calorimeter; Unemployed Workers' Dependants (Temporary Provisions) Act, 1921, a circular-letter by the Ministry of Labour in reference to which was sent to members; the Electricity Supply Bill, as affecting gas companies; alteration of the sliding-scale; exemption of gas companies from Unemployment Insurance and refund of amount paid by a gas company; a contention of the Ministry of Health that it is compulsory on a gas company to supply cookers, fittings, &c., on the prepayment system to houses built under a housing scheme; an explanatory leaflet with reference to the Unemployment Insurance Act, 1922, issued by the Ministry of Labour, copies of which were sent to members.

The Committee have to record with deep regret the death of their colleague, Mr. T. H. Hazell, who for many years rendered continuous and valuable services to the Association.

As in former years, the Secretary has had considerable correspondence with members on the principal matters dealt with by the Committee and Sub-Committees, in addition to advising them upon a variety of subjects, including the following: Income-tax depreciation; consumers' right to have meter retained on premises occupied by landlord when landlord objects; pension fund for employees; issue of shares at a discount; charging to revenue cost of re-sheeting gasholder; dispute with Postmaster-General as to telephone poles; Statutory Companies (Temporary Increase of Charges) Act, 1918; conversion of irredeemable preference stock into redeemable stock; "Winchester Clause"; armorial bearing licence duty in respect of gas company's crest; fixing meter box in pathway; payment of standard rate of wages; discount for prompt payment by sliding-scale company; payment of dividends to joint shareholders; laying gas-main along public footpath; income-tax on costs of Order for variation of charges; expense of reinstating roads; excess profits; assignment of policy of insurance; municipal trading; exemption of gas-works from local building bye-laws.

The following members retire from the Committee in accordance with Rule 12: Mr. Auchterlonie, Mr. Belton, Mr. Halkett, and Mr. Stevenson, all of whom, with the exception of Mr. Auchterlonie, offer themselves for re-election. There are two other vacancies on the Committee owing to the resignation of Mr. Ibbs and Mr. Iorns.

A QUIET AND UNEVENTFUL YEAR.

The CHAIRMAN, in moving the adoption of the report, said there were one or two points he might draw attention to a little more fully than had been done in the report itself. He thought he might say that it had been an uneventful year for the Association, although that seemed rather a contradiction of expression, having regard to the unusual publicity that had been given to gas affairs during the last few months. At any rate, the fact remained that so far as the working of the Association was concerned, the year had been quiet and uneventful compared with the previous one. Whether the next would prove to be equally so, only the future could tell them. The first important thing disclosed by the report was the fact that the Association was on a more substantial financial foundation than had been the case for some little time. This was a matter they had every reason to congratulate themselves upon, and in doing so, he did not think they could overlook the fact that the increasing favour with which the Association must be viewed, judging by the additional membership they had gained in the last twelve months, was due to the work of the Committee and their able Secretary, who had given the same close attention to the affairs of the Association during the past twelve months as heretofore. It must be realized that the Association was and had been doing useful work. The result of that had been a satisfactory increase of membership, and also of subscriptions. This was all the more to be pleased with having regard to the fact that they had lost one of their large contributors. Then with regard to the War Loan, that was a matter of finance, and he did not know whether they would be very deeply interested in it, but a profit of something like £150 was made on the purchase and sale of War Loan, which came in very useful in building-up their finances. There was a reference in the report to the fact that this sum had been carried to reserve. It was shown in the balance-sheet, which he was sure they would agree was the proper place for it; and he hoped it would be the nucleus of a nest-egg which would grow larger in the future.

SURVEY OF THE WORK OF THE ASSOCIATION.

With regard to the Trade Facilities Act, this was discussed, and it was thought it would prove a very useful piece of legislation for gas undertakings which had been suffering so considerably in the matter of raising capital economically for some time past. They had had a great deal of correspondence with regard to it, and in every case the full procedure was explained to the applicants. In the long run, however, he was afraid that not much came of it. The payment of back-dividends by sliding-scale companies was also very carefully gone into; and as the result of the investigations made it was decided that the proper thing to do would be for all those companies who were going for Bills to include in them a provision empowering them to pay back dividends. The circumstances in that matter were, of course, exceptional. They were not likely to forget—if they themselves did, their shareholders would remind them—the fact that they did go for a long time during the war with very considerably less than they had been accustomed to, and it was not unreasonable to suppose that if there were any possibility of some restoration being made in that respect, it would be only right that they should have an opportunity to adopt such an arrangement. The report also referred to the question of hard glass. The inquiry into the glass tariffs seemed to be a matter in which the Association should interest itself, and in order to be able to speak with authority one way or the other, the Association sent out inquiries, in order to get in touch with the views of the members. It was found that as nearly as possible opinions for and against were equally divided. Therefore the Association was not able to take any action. Personally, he was rather sorry, because in 1915, when the shortage of hard glass was very acute, he got into touch (here he was speaking more of domestic affairs than of the Association) with one of the largest makers of glass in this country (Messrs. Chance Bros.), and urged them to take up the manufacture of hard glass, the importation of which had ceased under the circumstances of the war. After some consideration—and he thought he might say some pressure, and certainly some promises on his part—Messrs. Chance Bros. undertook the work, and installed a very complete plant. He afterwards had the opportunity of seeing the processes at their works for the production of this glass. He said to Messrs. Chance Bros. that if they would put up this plant he would go on, at any rate for a number of years, until there was some opportunity of ascertaining what the future held in store. He assured Messrs. Chance Bros. that after the war he would not immediately revert to imported material. As a matter of fact, it was satisfactory to be able to say—and that was the point he was coming to—that *plus* the duty of 33⅓ p.ct., this was one of the cases in which the import duty had enabled British manufacturers to make and to sell with a profit. In other words, he was able to buy all his hard glass from Birmingham cheaper than he could do from the hard glass importers; and this, from the point of view of encouraging new industries, was a very satisfactory thing. [Hear, hear.] Another point in regard to this question was that at first, and for some considerable time, the material was rough and ill-finished. To make a long story short, he was now informed that the glass which was made to-day by British firms is as good as it can be bought from Germany. This was very satisfactory. The question of the continuance for a further period of the special allowance for depreciation of gasholders, &c., had been considered by the Committee (he believed it was raised at the last annual meeting). The Committee, however, did not consider it was a matter they could usefully press; and they had reason to believe that if they did, the Inland Revenue authorities would refuse it. As in previous cases, however, if there were any special circumstances pertaining to income-tax, the Association was always ready to act. It had acted in the past, and this matter of income-tax allowances was one among many others in which the Association had been able to do exceedingly valuable work. The increase of membership was referred to in the report; but he did not think he need deal with that.

EXEMPTION FROM CORPORATION PROFITS TAX.

The Association took its share with various other organizations representing public utility undertakings with regard to a continuance of the exemption from Corporation Profits Tax of public utility undertakings. It was one of those matters in which the more they could get to move in the required or a desired direction, the better. There was no question, he believed, that the help of the Association was other than useful in joining as they did with the other associations, electrical, transport, and so on. The result was that the exemption was deferred until the end of 1925. Many things might happen after then; but it was sincerely to be hoped that they had seen the last of the Corporation Profits Tax, at any rate as applied to public utility undertakings. It was a grossly unfair tax, and he believed that it only needed a little propaganda to bring home to the consumers that this was a tax on necessaries. It was not a tax on luxuries in any sense of the word. It only wanted propaganda to bring that home to the consumer, and he strongly suspected that we should then hear the last of the Corporation Tax as applied to public utility companies.

BASIC DIVIDEND PRINCIPLE.

Then the report referred to the question of what he might call the basic dividend principle as applied to gas undertakings. The Association had had an intimation that the Board of Trade were not at present prepared to grant Special Orders under the Gas Regulation Act adopting the basic dividend provisions similar to those created by the South Metropolitan, Sheffield, Cardiff, and some other companies. He himself went to see the Board of Trade with regard to that, and he did not think—in fact, he was sure—he was able to make any impression upon them as to the desirability of their considering it one of their functions to facilitate such Orders, because their impression was that the matter had not yet been sufficiently threshed out by the Parliamentary authorities. It seemed to him rather unfortunate that this view should be taken, because naturally, as he was somewhat interested in what might be called the basic dividend principle, he was anxious to see that principle extended as much as possible. He was bound to say that the more he saw of it the more he realized and felt that it was the right one. After all, however, he supposed there was something to be said for the Board of Trade, which had some hesitancy in initiating, or being responsible for the initiation of, any new policy. They relied and leaned (he supposed) on the precedents created and laid down by Parliament to guide them; and he imagined they found some difficulty in striking out a line of independence which, in some circumstances, might bring them into contact (perhaps into disagreement) with the authorities. He supposed it was bound to be one of the functions of a departmental authority that they should be very careful and cautious; and he thought they might take it that that was the reason for the Board of Trade attitude in this matter. At any rate, he thought the Board were of opinion that more should be said about this in Parliament than had been the case hitherto; and he did not think that, in the long run, that was likely to be a disadvantage. When the matter was first brought up in 1920, it was perfectly novel. It was true that its life had been a short one, but something, at any rate, had been done to prove the value of the new arrangements. The more they were looked into, and (if he might say so) the more they were criticized, the more it would be found that they would stand up to it. They would then have, if this inquiry took place, experience to work upon and not theory.

FACTORY AND WORKSHOPS DANGEROUS AND UNHEALTHY INDUSTRIES.

As to the draft regulations proposed to be made by the Home Secretary regarding the Factory and Workshops Dangerous and Unhealthy Industries, the Committee had this matter before them. Personally he had had the advantage of discussing it with some of his staff, who were more closely engaged in these chemical operations than he was

himself. As the result, he got an appointment with the representative of the Home Office—the official who, he believed, was responsible for the drafting of the regulations—and he was rather inclined to think that the interview helped in the direction of modification of the proposals. At any rate, if it did not, they were obtained directly or indirectly; and the Association was entitled to share the credit for making them less onerous and less difficult of application than they would have been if they had been insisted upon in their original form.

THE VALUE OF THE ASSOCIATION.

The report went on to refer to a great many other matters which had come under the notice of the Committee, all of which were important. One of the matters referred to was the use of the Boys calorimeter. An endeavour was made to get the apparatus and not necessarily the particular instrument, as the standard—that the appliance itself should be looked upon as the instrument to be adopted for testing rather than any particular form of it. There, again, he was afraid they had to report no progress at all. The authorities thought, or had decided he believed, that there was some advantage in sticking to the same instrument always; and he supposed that as these things (like themselves) were liable to error, it was just as well to have a regular instrument where the error, if there was one, was likely to be constant. He did not think he could usefully refer to any more of these matters. There was a very long list of them; and they only emphasized what he had said on a previous occasion—that the offices of the Association were a sort of clearing house for obtaining information for gas undertakings. They had only to apply to get exceedingly valuable and helpful advice. They had, in the first place, a very thoroughly qualified Secretary who was in touch with all Parliamentary matters and procedure, and who was able directly to reply to questions pertaining to the industry. Then they had a useful working Committee, not (and he said it without disrespect) an ornamental one, but a very useful and effective one closely in touch with all of these problems in the course of their weekly work, and who were content to go on working in an unassuming way to provide sources of information on these various matters. This, he thought, was one of the great advantages of the Association. He said it with great respect—that the Association was not run by the officials or official; rather it was run by the members, and as such he thought it had a great advantage over what might be the case if it were on a larger scale, or if the Committee were less constantly and regularly in touch with its affairs than they were.

THERM SYSTEM.

It was perhaps a curious thing that in a year of this kind, no reference was made in the report to the therm system. There was nothing about the therm in the report; but it would be interesting if the matter were just mentioned that afternoon, because he wished to point out one of the advantages of the Association. This was that, being an association of gas companies, it certainly was in a position to give—and he thought he did not misinterpret the views of the members if he said it was prepared to give—whole-hearted support to the continuance of the therm system. ["Hear, hear."] He was pleased to have their assent to that, because he believed there was an under-current of feeling that now they had got the advantages which the Gas Regulation Act gave them, they were ready to throw over the authorities, to say that the therm was unpopular, and to take the advantages of the Gas Regulation Act without the apparent disadvantage of the therm system. They knew, of course, that the therm system did not appear to be popular with the municipalities; but they must not overlook the fact that the adoption of the therm system (he would deal with its merits in a moment) was part of the bargain which the companies entered into with the authorities. The industry asked the authorities to help them in obtaining relief from the most onerous and most unfair burdens under which the industry—certainly the portion of it which was represented by companies—had been placed. The therm system was part of the bargain. He thought he might say that the authorities helped the gas companies to obtain the relief they desired, but they said that the industry must adopt the therm system. It did not seem to him to be playing the game—if he might use an ordinary expression—to do anything to throw over the therm system, and the industry should keep faith with the authorities. He did not think the authorities knew. They did not understand, they could not understand, the ins and outs of the methods of gas manufacture and supply as the industry did themselves. The industry was able to form a very clear opinion as to what the therm system involved, what it did, and what were its advantages; and it was up to the industry to enlighten the public in every possible way as to what was to be gained by them, and why the therm system was adopted by the authorities. Unfortunately, from the scale of the Gas Companies' Protection Association it was not able to do very much in the way of public propaganda, and it was neither easy nor cheap to attempt to teach the public something through the medium of the daily Press. But if they could not do that, he thought every undertaking ought to do what it could to the best of its ability; not look upon the therm system as something which had been forced down their throats, and which they did not want and which they did not want to make the most of, but something that was really going to prove, in the long run, a great advantage, because it placed the gas industry on a foundation of much greater security than was possible in any other direction. The more one considered what the therm system did, the more one got into touch with users, and industrial users especially, the more one realized the importance of therms as a comparable basis of value of the energy supplied by the gas industry, in precisely the same way that suppliers of electricity had in regard to theirs. The only other point that he need mention was with regard to the retiring members of the Committee—viz., Mr. Auchterlonie, Mr. Belton, Mr. Halkett, and Mr. Stevenson. All of these were eligible for re-election; and he was sorry that Mr. Auchterlonie had not seen his way clear to accept his re-nomination. Then there were also two other vacancies through the resignation of Mr. Ibbs and Mr. Iorns. They had all great regard for Mr. Ibbs. He was a most useful member of the Committee; they appreciated his counsel and valued his advice. Unfortunately, he was no longer with them. Mr. Iorns had resigned from the Committee as the result of the Company with which he was associated having amalgamated with another one. These were the salient points of the report itself. The balance-sheet he had, in general terms, already referred to, and it supported what he had said with regard to it. On the whole, he believed they would agree with him that the position of the Association was satisfactory, and that they might look forward to a continuance in the future of the useful work which they had done in the past. He would therefore ask the Vice-Chairman, Mr. Edwards, to second the proposal for the adoption of the report.

ELECTRICITY SUPPLY BILL.—CO-PARTNERSHIP.

Mr. R. W. EDWARDS (Aldershot), Vice-Chairman, said he had great pleasure in seconding the adoption of the report and accounts. So far as the Gas Regulation Act was concerned, they had all had a little experience of it—at least, most of the gas companies—and were beginning to realize that it carried with it not only some advantages, but also some obligations. He agreed with every word the Chairman had said with regard to the therm, and he was sure that the majority, if not every member, of the gas industry controlling companies also agreed. It seemed to him most unfair, under the old arrangement of charging by volume, that in one district they might find gas being supplied at 2s. or 3s. per 1000 c.ft., whereas in another area the price would be 5s. or 6s., and yet on equation the price per therm was the same. The Gas Regulation Act had done away with this, and there would be no anomalies, but a really accurate comparison in the value of the gas supplied by the various undertakings. Apart from this, as a commercial unit, it was far more useful in competing with electricity. Electricity had grown in strength during the last few years, and was growing, by the backing of the Government, more than ever. No special reference had been made by the Chairman to the passing of the Electricity Supply Bill; but he could assure the members of the Association that electricity supply had had the very careful consideration of those associated with the gas industry, to whom it was a matter of importance. That measure was modified considerably, but not to the extent the gas industry had looked for. It still remained a very serious matter; and when they thought of an industry like that of electricity, supplying light, heat, and power in competition with gas, and backed, as he had said, by the Government, it did seem unfair and unequal. As time went on, they would feel the effects of it; and it required them to be very careful. After all, they must keep faith with the public, and to show that at any rate gas still holds its own, and more than holds its own; and for this reason he welcomed the Gas Regulation Act as a whole. There was one other matter which the Chairman had not referred to—but he believed the reason for this was that Dr. Carpenter had been a pioneer following in the footsteps of Sir George Livesey—and that was that, as time went on, he sincerely hoped gas companies would embrace, in conjunction with their sliding-scale, co-partnership. Not only would this be found advantageous, but those who, as time went on, adopted the basic dividend, it would be of extreme value in binding together their undertaking and their consumers, because, by the basic dividend system, they had more closely defined the proportion in which the surplus profits should be divided. Those who had had experience of the sliding-scale would know that the variation was extreme in some cases. In many instances, the proportion which went to the shareholders was infinitesimal compared with the proportion which was applied to the reduction of the price of gas. The basic dividend principle did away with this, and set down in cold figures and cold letters the proportion which should go to the consumer and the proportion which should be divided between the shareholder and the workman. To his mind, this must lead eventually to better prosperity of gas companies, because it there and then set down something for the investor to look to. He realized that there was some prospect, and paid more for his new stock. In this way gas companies raised cheaper capital and kept down the capital ratio, and, by careful management and strict supervision of capital expenditure, the first charge on a gas undertaking was kept down, and so were enabled to sell gas cheaply in competition with electricity.

The motion for the adoption of the report and accounts was then carried unanimously.

MR. REGINALD CLARRY ELECTED A VICE-PRESIDENT.

The CHAIRMAN said the next business was to elect a President and Vice-Presidents for the coming year. Their President, as they all knew, was Sir Fortescue Flannery, and the Vice-Presidents were Mr. H. E. Jones and Mr. Charles Hunt. One of the disadvantages under which the gas industry had suffered had been the smallness of its representation, if he might use the word, in Parliament. They would all have noticed—and he was sure he could say with satisfaction—that Mr. Reginald Clarry had been elected a member of the House of Commons. [Applause.] Unfortunately, he would have to go through it all again; but this could not be avoided. The interest to them in the election of Mr. Reginald Clarry arose from two directions. One was, of course, that he was the son of their old friend, whom he was pleased to see present and whom they all respected and admired. In the second place, Mr. Reginald Clarry was trained as a gas engineer, and at one time occupied the position of one of the station engineers in London. Therefore, they had in Parliament at any rate a man who was not only of the right stock—which was all-important in this as in all other matters—but he also knew the business from beginning to end, and he could not but think it would be exceedingly useful and desirable if, in addition to the two present Vice-Presidents, they were to add the name of Mr. Reginald Clarry. What he wanted to do was to propose—and he would do it *en bloc*, as it would be shorter—the re-election of Sir Fortescue Flannery as President, the re-election of Mr. H. E. Jones and Mr. Charles Hunt as Vice-Presidents, and the election of Mr. Reginald Clarry as a Vice-President.

Mr. R. W. EDWARDS seconded; and the motion was carried unanimously.

THE COMMITTEE.

The CHAIRMAN said the next business was to elect six members of the Committee—three to fill the places of Mr. Ibbs, Mr. Iorns, and Mr. Auchterlonie; while Messrs. Belton, Halkett, and Stevenson, who retired, offered themselves for re-election. He would first move the re-election of Messrs. Belton, Halkett, and Stevenson.

Mr. EDWARDS seconded; and the motion was carried.

Mr. EDWARDS said that some time ago Mr. Phillips, of Luton, was a candidate; but he stood down in favour of someone else. He would like on this occasion to propose the election of Mr. Phillips, of Luton, Mr. Townsend, of Colchester, and Mr. Whittaker, of Grays, to fill the remaining three vacancies.

Mr. GEORGE CLARRY seconded, and the motion was carried.

Mr. WHITTAKER (Secretary of the Grays and Tilbury Gas Company) expressed his thanks to the meeting for electing him to the Committee.

The CHAIRMAN then proposed the re-election of Mr. W. A. Scott as Honorary Auditor to the Association.

Mr. EDWARDS seconded; and the proposal was carried.

Mr. SCOTT also expressed his thanks.

THE SECRETARY THANKED AND RE-ELECTED.

The CHAIRMAN said there was one other matter they must not forget, and that was a vote of thanks to the Secretary. This was not the least important duty he had to discharge. He was sure that those who came into contact with Mr. Cooper on affairs connected with the Association must be more and more impressed, as time went on, with his suitability for the position he occupied. In fact, he did not know quite what the Association would do unless they had Mr. Cooper behind them whenever opportunity arose. They would all agree that Mr. Cooper was always ready to be consulted. His advice was always sound and always valuable, and it would be exceedingly difficult indeed to attach a value to it, because he could not imagine anybody performing the duties as well as Mr. Cooper did, and had done for so many years—in fact, ever since the beginning of the Association, exactly 25 years ago. He congratulated both Mr. Cooper and the Association on this, and hoped they could look forward to his continuing with them for very many years. He therefore had the greatest pleasure in proposing a hearty vote of thanks to Mr. Cooper for his admirable services to the Association.

Mr. J. L. GARRARD (Eastbourne) said he was rather like the prodigal child, because he had not been able, for a number of years, to take any part in the work of the Association. His Company at Eastbourne, however, had just seen their way to become members. He used to be at Ipswich and Cheltenham; and at those times he was directly connected with the Association. This, however, was the first occasion he had had the opportunity of being at one of the meetings for a number of years; and he therefore had great pleasure in seconding the vote of thanks to the Secretary. Arising out of the report, there was one matter to which he would like to draw attention, as it concerned the Secretary to some extent. There was a large number of matters of vital interest referred to in the report; but the members could get no knowledge of the details of the matters mentioned. He was not going to suggest that the cases should be published, and details given in that way; but it would be interesting to know in what way the members could get fuller details of the matters with which the Association was concerned during the year. He imagined the answer would be that if anyone asked the Secretary he would always be pleased to give them any information they required if he had it.

The CHAIRMAN: That is so. That is the only way.

Mr. D. HELPS (Reading), in supporting the vote of thanks, said Mr. Cooper was a positive encyclopædia, particularly in regard to the legal side of gas undertakings; and whether it was an engineer or a secretary of a company, they invariably obtained the information they asked for. Mr. Cooper paid the closest attention to every inquiry, and his advice was invariably sound. The smaller the company, the more valuable was the fact that if they belonged to the Association they could go to Mr. Cooper for advice on many points. He regarded it as important that this fact should be made clear to the smaller companies.

Mr. W. E. FREE (Windsor) said that he, too, did not feel that he could let this opportunity pass without saying how he had been to Mr. Cooper on many occasions, and invariably obtained sound advice.

Mr. R. W. EDWARDS thought the vote of thanks should link with it the name of Mr. Campbell Cooper. He was a man for whom they had the highest respect, and he had done some exceptionally good work for the Association, together with his brother, Mr. F. E. Cooper, and was one of the most brilliant men in parliamentary practice. He knew that everyone present would agree that the vote of thanks should include both Mr. F. E. Cooper and Mr. Campbell Cooper.

The CHAIRMAN, in putting the vote of thanks to the meeting, said he was sure that Messrs. Cooper must feel exceedingly gratified, as he did himself, with the manner in which their names had been received that afternoon. Before calling upon Mr. Cooper to reply, he would like to say, with regard to Mr. Garrard's suggestion, that it would be impossible for the Association to circulate all the cases or all the replies that they received from time to time; but if there was any question of important principle involved, he believed he was right in saying that that information would be circulated. It was obvious that the proper course for all the members to take was to place their difficulties, as and when they arose, before Mr. Cooper, and give him the opportunity of dealing with them, having in mind the circumstances which were placed before him. He believed this course, in the long run, was much more likely to be helpful and useful than any general circulation of information pertaining to cases, which, although on the face of them there might be a certain similarity, yet, when further investigated, would very likely disclose the fact that there were fundamental differences between them.

The vote of thanks was carried with acclamation.

Mr. F. E. COOPER expressed his indebtedness to the meeting for the kind way in which the vote of thanks had been carried, and for the remarks that had been made. He was afraid they had spoken far too highly of him, and he could only assure them that he always tried to do his utmost for the interests of the Association. If he had succeeded to some extent he was satisfied.

Mr. CAMPBELL COOPER, who also acknowledged the vote of thanks, referred to the paragraph in the report as to the application to Parliament to allow the payment of arreas of dividends in the case of sliding-scale companies. He had tried for that this year; but, although it had been passed by the Lord Chairman and his Counsel in the House of Lords, the Speaker's Counsel in the House of Commons had told him that exceptions could not be made in individual cases. He had asked how it could be done unless each individual company itself promoted a Bill, and added that the Gas Companies' Protection Association felt very strongly on the matter. Speaking from recollection, the Speaker's Counsel had suggested that the Association should make some representation to the authorities about it; and although he could not say what the result of such representation would be, there would, at any rate, be something more than the application of one company to go upon.

VOTE OF THANKS TO DR. CARPENTER.

Mr. EDWARDS said he had one very important duty, and that was to propose a vote of thanks to the Chairman.

Mr. J. FERGUSON BELL (Derby), seconded.

Mr. W. A. SCOTT asked to be allowed to support the resolution.

Mr. C. F. BOTLEY (Hastings) also wished to be identified with it.

The vote of thanks having been carried with acclamation,

The CHAIRMAN said he was very much obliged for the kind vote of thanks. On an occasion like this, he thought there was only one course, and that was to adopt the suggestion and continue his responsibility for the affairs of the Association. All he asked was that they would give him his freedom if the necessity arose, and accept from him an assurance that, so far as he could, he would carry on.

REPORTS OF OFFICIAL TESTINGS OF LONDON GAS.

For the Quarter ended Sept. 30.

The following reports of the official testings of the gas supplied for the past quarter by the Companies named have been received from the Gas Referees—Prof. C. V. Boys, Mr. W. J. A. Butterfield, and Dr. J. S. Haldane. All the Companies fulfilled their statutory obligations.

The Gas Light and Coke Company.

[The Company were required to supply gas of an average calorific value for each quarter of 500 B.Th.U. gross per cubic foot—at which value 1000 c.ft. are equivalent to 5 therms.]

The average calorific value for the quarter was 501·6 B.Th.U.

On no day in the quarter was the calorific value at any testing-place deficient by 6 p.ct. or more.

No trace of sulphuretted hydrogen was found at any testing-place on any day during the quarter.

On no day in the quarter was the pressure at any testing-place less than 2 in.

South Metropolitan Gas Company.

[The South Metropolitan Gas Company were required to supply gas of an average calorific value for this quarter of not less than 560 B.Th.U. gross per cubic foot—at which value 1000 c.ft. are equivalent to 5·6 therms.]

The average calorific value for the quarter was 565·0 B.Th.U. gross.

On no day in the quarter was the calorific value at any testing-place deficient by 6 p.ct. or more.

No trace of sulphuretted hydrogen was found at any testing-place on any day during the quarter.

On no day in the quarter was the pressure at any testing-place less than 2 in.

Commercial Gas Company.

[The Commercial Gas Company were required to supply gas of an average calorific value for this quarter of not less than 475 B.Th.U. gross per cubic foot—at which value 1000 c.ft. are equivalent to 4·75 therms.]

The average calorific value for the quarter was 492·0 B.Th.U. gross.

On no day in the quarter was the calorific value at any testing-place deficient by 6 p.ct. or more.

No trace of sulphuretted hydrogen was found at any testing-place on any day during the quarter.

On no day in the quarter was the pressure at any testing-place less than 2 in.

South Suburban Gas Company.

[The South Suburban Gas Company were required to supply gas of an average calorific value for each quarter of 460 B.Th.U. gross per cubic foot—at which value 1000 c.ft. are equivalent to 4·6 therms.]

The average calorific value for the quarter was 477·7 B.Th.U. gross.

On no day in the quarter was the calorific value at any testing-place deficient by 6 p.ct. or more.

No trace of sulphuretted hydrogen was found at any testing-place on any day during the quarter.

On no day in the quarter was the pressure at any testing-place less than 2 in.

The Wandsworth, Wimbledon, and Epsom District Gas Company.

[The Wandsworth, Wimbledon, and Epsom District Gas Company were required to supply gas of an average calorific value for each quarter of 470 B.Th.U. gross per cubic foot—at which value 1000 c.ft. are equivalent to 4·7 therms.]

The average calorific value for the quarter was 479·7 B.Th.U. gross.

On no day in the quarter was the calorific value at any testing-place deficient by 6 p.ct. or more.

No trace of sulphuretted hydrogen was found at any testing-place on any day during the quarter.

On no day in the quarter was the pressure at any testing-place less than 2 in.

The Brentford Gas Company.

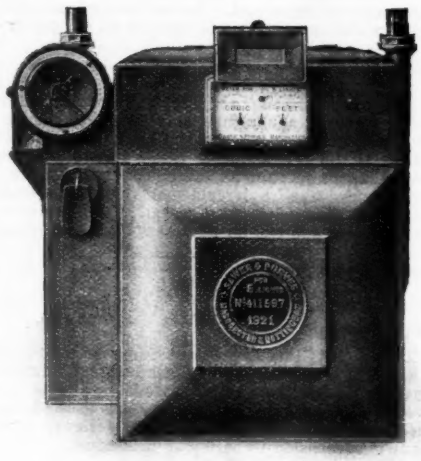
[The Brentford Gas Company were required to supply gas of an average calorific value for each quarter of 460 B.Th.U. gross per cubic foot—at which value 1000 c.ft. are equivalent to 4·6 therms]

The average calorific value for the quarter was 471·2 B.Th.U. gross.

On no day in the quarter was the calorific value at any testing-place deficient by 6 p.ct. or more.

No trace of sulphuretted hydrogen was found at any testing-place on any day during the quarter.

On no day in the quarter was the pressure less than 2 in.



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THE PIONEERS

OF THE SLOT METER,

SAWER & PURVES

(BRANCH OF METERS LIMITED),

MILES PLATTING, MANCHESTER. RADFORD ROAD, NOTTINGHAM.

45-47, Westminster Bridge Rd., LONDON, S.E.

APPEALS TO THE CHIEF GAS EXAMINER.

The following are the Gas Regulation Act (Appeal Procedure) Rules, dated April 11, 1922, made by the Board of Trade with reference to procedure in appeals under section 6 of the Gas Regulation Act 1920 (10 & 11 Geo. 5, c. 28).

The Board of Trade, under the powers conferred upon them by section 16 of the Gas Regulation Act, 1920, and of all other powers enabling them in that behalf, hereby make the following rules:

1.—(i) These rules may be cited as the Gas Regulation Act (Appeal Procedure) Rules, 1922.

(ii) In these rules, unless the context otherwise requires:

"The Act" means the Gas Regulation Act, 1920; and "The Respondents" means in the case of an appeal under sub-section (1) of section 6 of the Act, the Gas Referees, and in the case of an appeal under sub-section (2) of that section, the local authority or local authorities by whom the gas examiner whose report is appealed against was appointed, or, in any case in which a gas examiner has been appointed by quarter sessions, the Clerk of the Peace for such quarter sessions.

2. An appeal under sub-section (1) or sub-section (2) of section 6 of the Act shall be made by sending to the Chief Gas Examiner, Board of Trade, S.W. 1, within the time specified in the sub-section of section 6 of the Act under which the appeal is made, a notice of such appeal signed by the appellants or by their duly authorized agents, together with the original prescription or report appealed against, or a true copy thereof.

3. The appellants shall, at the same time, send a copy of such notice of appeal to the respondents.

4. The appellants shall send to the Chief Gas Examiner and to the respondents, either with their notice of appeal or within fourteen days thereafter, a concise statement in writing of the facts and contentions on which they rely.

5. The respondents shall, within 28 days of the receipt by them of the appellants' statement, notify the Chief Gas Examiner whether, and to what extent, they admit the facts stated in the appellants' documents, and shall send to the Chief Gas Examiner a concise statement of the facts and contentions on which they rely.

6. If the appeal be made under sub-section (2) of section 6 of the Act, the respondents shall, in addition to the statement above-mentioned, send to the Chief Gas Examiner copies of reports (if any) made by the gas examiner during a period of ten days both before and after the date to which the report appealed against relates.

7. The respondents in any appeal shall, within the time provided by rule 5, send to the appellants a copy of the statement of facts and contentions upon which they rely.

8. Where in any appeal under sub-section (1) of section 6 of the Act it shall appear to the Chief Gas Examiner that any person or body other than the appellants and respondents is interested, the appellants and respondents shall, upon being requested so to do by the Chief Gas Examiner, forward to such person or body a copy of any statement or other document submitted by them to the Chief Gas Examiner.

9. Any such person or body so interested shall, within 28 days of the receipt by them of such statement and other documents, forward to the Chief Gas Examiner and to the appellants and the respondents a concise statement setting out the facts and contentions upon which they rely, and in any such case the appellants and respondents shall, within fourteen days of the receipt of such statement, be entitled to submit a statement in reply which shall be sent by them to the Chief Gas Examiner and a copy thereof to such person or body interested.

10. The Chief Gas Examiner may, at any stage of the proceedings, allow the amendment of any notice, statement, or particulars upon such terms as he may think fit.

11. The Chief Gas Examiner may at any time require the appellants, the respondents, or the person or body interested as aforesaid, to submit in writing such further particulars as he may think necessary.

12. Unless the appeal be withdrawn, the Chief Gas Examineer shall notify the appellants, the respondents, and the person or body interested as aforesaid, of the place, date, and time for hearing the appeal.

13. At the hearing the appellants, the respondents, and the person or body interested as aforesaid shall, subject to the direction of the Chief Gas Examiner, be entitled to call such evidence as they may think fit.

14. The costs of any appeal, including the costs of the hearing, shall be in the discretion of the Chief Gas Examiner, who may direct to and by whom, and in what manner those costs, or any part thereof, shall be paid, and may tax or settle the amount of costs to be so paid, or any part thereof.

15. The Chief Gas Examiner may, if he thinks fit, and subject to such conditions as he may impose, proceed with the consideration of any appeal, notwithstanding any failure or omission by any persons to comply with any of the requirements of these rules, or the non-attendance of any party at the hearing.

Given under the hand of a Secretary to the Board of Trade, this 11th day of April, 1922.

H. A. PAYNE,
A Secretary to the Board of Trade.

Stove Hire Charges at Macclesfield.—A press correspondent reports that the Macclesfield Gas Committee recently decided to increase the charges for gas-stoves; but the protest was so great that they rescinded their resolution. Later, however, they increased the fee for hire under the head of "maintenance charges." Consumers threatened to strike, and the post-bag of the Gas Committee every day became full of requests for the removal of the stoves. After hearing from their Engineer that the cost of removing and storing the stoves would be greater than the revenue they expected to obtain, the Committee rescinded this resolution.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Oct.* 30.

Pitch remains the chief item of interest in the London tar products market, and the price continues to advance; the figure to-day being not below 110s. to 112s. 6d. per ton f.o.b. makers' works. Creosote also maintains its firm tone at from 7d. to 7¼d. per gallon naked; but only small quantities are available. Pure benzole and pure toluole are steady at about 2s. 6d. per gallon at makers' works. Solvent naphtha is quiet at from 2s. to 2s. 1d. per gallon for 95-160 quality.

Tar Products in the Provinces.

Oct. 30.

The average values for gas-works products during last week were: Gas-works coal tar, 65s. to 70s. Pitch, East Coast, 110s. to 115s. f.o.b. West Coast—Manchester, 102s. 6d. to 105s.; Liverpool, 103s. 6d. to 106s. 6d.; Clyde, 105s. to 108s. Benzole 90 p.ct. North, 1s. 9d. to 1s. 10d.; crude 65 p.ct. at 120° C., 1s. 1⅛d. to 1s. 2⅛d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 10d. to 1s. 11d. Toluole, naked, North, 2s. to 2s. 3d. nominal. Coal tar crude naphtha in bulk, North, 8½d. to 9½d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 10d. Heavy naphtha, North, 2s. to 2s. 1d. Creosote, in bulk, North, liquid, 6½d. to 6⅝d.; salty, 5½d. to 5⅝d. Scotland, 4⅝d. to 5d. Heavy oils, in bulk, North, 6¼d. to 6½d. Carbolic acid, 60 p.ct., 2s. to 2s. 1d. Naphthalene, £12 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 5d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Manchester District Tar Prices.

The average price realized in the Manchester district for the sale of tar, according to the sliding-scale, for the month of September was £3 6s. 4·71d. per ton.

FROM A MARKET CORRESPONDENT.

Tar Products.

These markets continue much in the same condition as when last reported. Stocks in most lines are small, and there has been some falling-off in the American demand largely owing to the new tariff. Pitch, however, maintains its strength, and an upward tendency is still in evidence. Over £5 per ton is now reported to have been paid, although most business is being done at just under this figure. Tar is in request for road purposes. The recent improvement in the rubber manufacturing industries has produced a better feeling in solvent naphtha, which is now quoted about 2s. 3d. per gallon. Carbolic acid is also better, with crude 60's at just over 2s. per gallon, and 40 p.ct. crystals at 7d. per lb. Cresylic acid is without any material alteration, and creosote remains at 6½d. per gallon. Benzole is a shade lower. In intermediate products, business remains on a small scale, but with many inquiries for export. Aniline oil and salts are 1s. 1d. per lb.; beta naphthol is 1s. 5d.; and resorcin 5s. 6d. per lb.

Sulphate of Ammonia.

This market continues strong, and the home trade stands a good chance of being unable to obtain their supplies in the coming season. The export trade continues on a comparatively large scale, and for the time being most of the production is going abroad. This overseas demand is likely to continue, and as foreign countries are much in the same position as ourselves—*i.e.*, large demand and small production—it would seem that higher prices must prevail in the very near future. Home prices remain at £16 13s. for neutral 25¾ p.ct. ammonia.

TRADE NOTES.

Richmond Gas-Fires.

The Richmond Gas Stove and Meter Company's Gas-Fire Catalogue cover has been sent out by the publishers of "Commercial Art" as a supplement to the October number, as an outstanding example of a high-class catalogue cover. This cover, which is in photogravure, with embossed lettering in a rich orange, was designed in the Richmond Company's Advertising Department in London.

British Furnaces, Ltd., Water-Gas System.

The water-gas plant ordered by the Emsworth Gas and Coke Company, Ltd., Sussex, from British Furnaces, Ltd., No.7, Grosvenor Gardens, S.W., in July last, was started-up on Oct. 25, and is working very satisfactorily. The one-valve control gear is proving all that was anticipated. The plant has an hourly capacity of 1400 c.ft., and is complete with fan and steam-engine.

"Pyruma" Fire Cement.

A copy of their new booklet dealing with "Pyruma" fire cement is to hand from Messrs. J. H. Sankey and Son, Ltd., of Canning Town, together with an intimation that they will be pleased to forward copies, with samples of the material, to any readers desirous of having them. This cement can be used for many purposes, for which it is claimed to be eminently suitable.

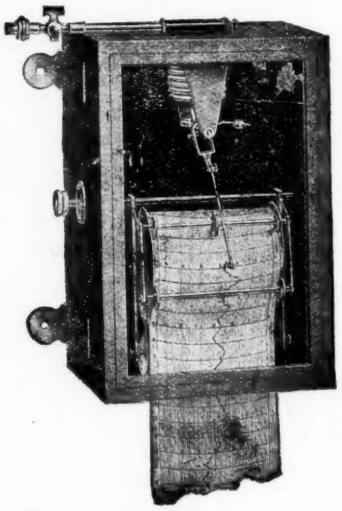
The Directors of Meters, Ltd., have declared, on account of the current year, dividends at the rate of 5½ p.ct. per annum on the preference shares, and at the rate of 5 p.ct. per annum on the ordinary shares.

SIMMANCE'S DEAD BEAT RECORDER

TAPE CHART PATTERN

For Pressure or Vacuum.

NO LIQUIDS USED.



The chart roll is renewed 6 times a year.

The record can be torn off at any interval.

Lowest Range: 0-2 inches water.

Highest Range: 0-300 lbs. per sq. inch.

Suitable for Gas, Air, Water, or Steam, and may be used on Crude Gas.

Sole Licensees:

ALEXANDER WRIGHT & Co., Ltd., WESTMINSTER

TELEGRAMS: PRECISION VIC. TELEPHONE: VICTORIA 1207.

STOCK MARKET REPORT.

BUSINESS on the Stock Exchange was quiet last week, with a disposition to await Election results; and the general tone was decidedly dulled by the continuance of weakness in foreign exchanges. In the gilt-edged group, Home Government issues were little changed, the big four on Friday marking: Consols 57-57½, War Loan 98 11/16 98 15/16, Funding 85½ 85 13/16, Victory 88⅜ 88⅞. Indian and Colonial were irregular. Home Rails showed some weak points, but Canadians were fair, and Argentines strong.

The Foreign Market was dull throughout; but French looked up again before the close. Rubbers and Oils moved heavily.

Business in the Gas Market was well up to the mark in point of volume, and much more generously distributed throughout the 1st. The tone was very firm; all variations in quotation being in the upward direction. The London Companies were steady and unchanged. In the Suburban and Provincial category, Brentford "A" rose 2, ditto "B" 2, Croydon sliding-scale 3½, Newcastle 1, the three Sheffields 1 each, and Tynemouth 2. The Continentals were unchanged, save for a rise of 1 in Imperial Continental 3½ p.ct. debenture. In the remoter world, Oriental rose 6.

The following transactions in gas during the week were recorded: On Monday, Aldershot 69, Alliance and Dublin 65¾, Brentford "A" 102½, European 10⅜, Gas Light ordinary 95½, 95⅝, 95⅞, 96, 96¼, 96½, ditto preference 78, ditto 3 p.ct. debenture 61, ditto 7½ p.ct. Ilford debenture 101½, Imperial Continental 159, 159½, 160, ditto debenture 75, 75½, Liverpool 5 p.ct. ordinary 91⅜, Oriental 100, Primitiva 11s., 11s. 6d., 12s., ditto preference 36s., Sheffield "A," "B," and "C" 98 each, South Metropolitan 95, 95¼, ditto 6½ p.ct. debenture 106, Swansea 7 p.ct. preference 104, Liverpool 7 p.ct. preference 106, Mid Kent 22s. 6d., 23s., Cork 81s. 3d. On Tuesday, Croydon max. div. 80, European 10⅜, Gas Light ordinary 96¼, 96⅜, 96½, 96⅝, 96⅔, ditto maximum 63, Imperial Continental 158⅜, 159, ditto debenture 73, Primitiva preference 35s., 36s. 6d., Sheffield "C" 96½, South Metropolitan 94⅜, 95, 95¼, South Suburban debenture 97½. On Wednesday, Aldershot 70, Brentford "B" 101½, ditto preference 84½, 85, Commercial 4 p.ct. 94¼, 94⅜, 95, ditto 3½ p.ct. 94⅜, 95, Croydon max. div. 81, Continental Union preference 52, Gas Light ordinary 95⅝, 96, 96⅛, 96½, 96⅝, ditto maximum 62½, ditto preference, 77½, Hastings and St. Leonards 3½ p.ct. 78, Imperial Continental 158½, 159⅛, ditto debenture 75, Oriental 100⅜, 101, Primitiva preference 36s., South Metropolitan 94⅜, 95, 95¼, 95½, Tottenham "B" 100⅜. On Thursday, Brentford "A" 101, Continental Union preference 52½, European 10⅜, Gas Light ordinary 95¾, 96, 96⅛, 96½, 96⅝, ditto maximum 63½, ditto preference 77½, ditto 3 p.ct. debenture 61, ditto 10 p.ct. bonds 190, 191, Imperial Continental 157½, 158, 158½, 159½, ditto debenture 74½, 75, Monte Video 63½, Primitiva 11s., ditto preference 34s. 6d., 34s. 9d., South Metropolitan 94½, 95¼, South Suburban 97½, ditto 5 p.ct. debenture 97½, Wandsworth "B" 99½, 100, ditto "C" 90, 90¼, ditto New 90, 90½, Brentford 7½ p.ct. mortgage 102, 102½, Barnet "D" 85, 85½, Danish 5. On Friday, Brentford "B" 100½, Croydon max. div. 81, Continental Union preference 51¾, Derby 84¾, European 10½, 10¾, Gas Light ordinary 95, 95⅛, 95⅝, 95¾, 96, 96¼, 96½, ditto maximum 62, 63, 63½, ditto preference 78½, ditto debenture 62, ditto 10 p.ct. bonds 190, Imperial Continental 156½, 157, 158½, ditto debenture 74½, Primitiva preference 35s. 6d., 38s., South Metropolitan 6½ p.ct. debenture 106, South Suburban debenture 99, Tottenham "B" 100½, 101.

In the Money Market, there was in the earlier portion of the week some shortage of adequate supplies to meet demands, and rates hardened accordingly. But by Thursday the tide had turned, and things ruled easy for the rest of the week. Discount terms took a similar course. Silver made a recovery, but only partially maintained it. The Bank of England rate was 3 p.ct., as fixed on July 13.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Transactions.
£			p.c.					
182,049	Stk.	Aug. 24	4	4%	Aldershot 4 p.c. Pref.	..	68—73	69—70
1,551,868	,,	Oct. 5	2½	5%	Alliance & Dublin Ord.	59—64	62—67	65¾
374,000	,,	July 13	4	4%	Do. 4 p.c. Deb.	76—79	60—65	...
280,000	5	Oct. 19	7½	4/-	Bombay, Ltd.	5⅞—6⅛	4½—5*	...
100,000	5	Aug. 10	16	7½%	Bourne-mouth Gas and Water { 5 p.c.	..	11—12	...
383,110	10	,,	7	7%	Bourne-mouth Gas and Water { B 7 p.c.	15—15½	10½—11⅛	...
115,000	10	,,	6	6%	Bourne-mouth Gas and Water { Pref. 6 p.c.	13½—14	8—9	...
162,065	—	June 29	—	4%	Bourne-mouth Gas and Water { 4 p.c. Deb.	..	73—78	...
992,045	Stk.	July 27	14	6t/-	Brentford A Consolid.	261—266	100—105	101—102½
734,920	,,	,,	11	6t/3	Do. B New	204—209	100—105	100½—101½
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	82—87	84½—85
221,400	,,	June 15	4	4%	Do. 4 p.c. Deb.	91—93	75—80	...
214,775	,,	Aug. 24	11	11½%	Brighton & Hove Orig.	208—213	165—170	...
244,200	,,	,,	8	8½%	Do. A Ord. Stk.	154—159	120—125	...
1,287,500	Stk.	July 28	5	5%	Bristol 5 p.c. max.	..	..	...
530,000	20	Oct. 5	12½	22/6	British	44—45	30—32	...
120,000	Stk.	June 29	4	4%	Do. 4 p.c. Deb. Stk.	88—90	75—80	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	53—58	...
100,000	10	June 1	—	7%	Cape Town & Dis., Ltd.	1½—2½	6½—7½	...
100,000	10	Oct. 19	—	4½%	Do. 4½ p.c. Pref.	4—6	6—7*	...
100,000	Stk.	June 29	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	73—78	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	...
1,513,280	,,	July 27	5/9/4	56/-	Commercial 4 p.c. Stk.	106—108	93—98	94½—95
560,000	,,	,,	5½	55/-	Do. 3½ p.c. do.	103—105	93—98	94½—95
475,000	,,	June 15	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	55—60	...
800,000	,,	Dec. 15	4	—	Continental Union, Ltd.	76—79	29—34	...
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	50—55	51½—52½
660,000		Sept 1	—	6%	Croydon sliding scale.	..	88—93	..
284,975		,,	—	5%	Do max div.	..	78—82	80—81
492,270	Stk.	—	6	4½%	Derby Con. Stk.	123—125	..	84¾
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	..	...
1,002,180	10	July 13	10	5/0	European, Ltd.	17½—18	10½—11½	10½—10⅝
16,298,975	Stk.	July 27	4/17/4	52/-	Gas Light & Coke { 4 p.c. Ord	98—102	95—97	95—96⅝
2,600,000	,,	,,	3½	35/-	Gas Light & Coke { 3½ p.c. max.	76—79	61—64	62—63¾
4,062,235	,,	,,	4	4%	Gas Light & Coke { 4 p.c. Con. Pref.	96—99	76—81	77½—78½
4,674,850	,,	June 15	3	3%	Gas Light & Coke { 3 p.c. Con. Deb.	72½—74½	61—64	61—62
130,000	,,	Dec. 11	10	10%	Gas Light & Coke { 10 p.c. Bonds	..	..	190—191
	—	—	—	—	Gas Light & Coke { 7½ p.c. Ilford Deb.	..	..	101½
82,500	,,	Sept. 21	5	65/7½	Hastings & St. L. 5 p.c.	..	95—100	...
258,740	,,	,,	3½	50/7½	Do. 3½ p.c.	87—89	77—80	78
70,000	10	May 18	11	7½%	Hongkong & China, Ltd.	16½—16¾	6—7	...
86,600	Stk.	Aug. 24	9	9½%	Hornsey 7 p.c.	..	127—132	...
1,976,000	,,	May 18	9	10%	Imperial Continental	150—160	156—161	156½—160
404,800	,,	Aug. 10	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	71—76	73—75¼
235,242	,,	July 27	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	95—100	...
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord.	..	..	91⅜
165,736	,,	Aug. 10	7/5/6	87/3	Maidstone 5 p.c.	..	87—92	...
63,480	,,	June 29	—	3%	Do. 3 p.c. Deb	..	53—59	...
75,000	5	,,	6	6%	Malta & Mediterranean Met. of Melbourne { 4½ p.c. Deb.	4½—4¾	3½—3¾	...
250,000	100	Oct. 2	4½	4½%		99—101	83—96	...
541,920	Stk.	June 1	4	4%	Monte Video, Ltd.	11½—12	62—67	63½
1,875,892	,,	July 27	4½	4½%	Newcastle & Gatsh'dCon.	98½—99½	79—80	...
529,705	,,	June 29	3½	3½%	Do. 3½ p.c. Deb.	82—83	67—68	...
15,000	10	Aug. 26	—	7/6	North Middlesex 10 p.c.	..	..	...
55,940	10	Aug. 24	7/14/0	7/8⅝	,, ,, 7 p.c.	14—15	10½—11⅛	...
300,000	Stk.	May 18	8	8%	Oriental, Ltd.	117—122	98—103	100—101
60,000	5	—	10	—	Ottoman, Ltd.	7¼—7⅝	2—3	...
188,120	Stk.	June 29	—	6/3/9%	Plym'th & Stonh'se 5 p.c.	..	93—98	...
60,000	50	Aug. 24	13	65/-	Portsea Island, B	128—131	100—105	...
100,000	50	,,	12	60/-	,, C	118—121	85—90	...
249,980	5	—	8	—	Primitiva Ord.	5½—6	9/16—11/16	11/—12/-
499,960	5	—	5	—	Do. 5 p.c. Pref.	4¾—5	1⅛—1⅜	34/6—38/-
521,600	100	June 1	4	4%	Do. 4 p.c. Deb.	91—93	68—73	...
600,000	Stk.	July 27	4	4%	Do. ,, ,, 1911	..	55—60	...
346,198	,,	June 29	4	4%	River Plate 4 p.c. Deb.	85—87	53—58	...
150,000	10	Sept. 21	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	5½—6	...
125,000	50	July 3	5	5%	San Paulo { 5 p.c. Deb.	47—49	35—38	...
135,000	Stk.	Aug. 24	10	5%	Sheffield A	223—224	97—99	98
209,984	,,	,,	10	5%	Do. B	222—224	97—99	98
523,500	,,	,,	10	5%	Do. C	220—222	97—99	95½—98
133,201	Stk.	Sept. 15	4	4%	Shrewsbury 5 p.c.	..	..	...
90,000	10	June 29	9	7½%	South African	10½—11⅛	7—9	...
6,609,895	Stk.	July 27	5/4/0	5%	South Met. Ord.	111—113	91—97	94½—95½
250,000	,,	July 13	—	5%	Do. Red. Pref.	..	94—96	...
1,895,445	,,	,,	3	3%	Do. 3 p.c. Deb.	72½—74½	61—64	...
224,820	,,	Aug. 24	8½	8½%	South Shields Con. Stk.	157—159	106—108	...
1,087,795	,,	,,	6	6%	S'th Suburb'n Ord. 5 p.c.	114—116	97—100	97½
368,837	,,	June 15	5	5%	Do. 5 p.c. Deb. Stk.	116—118	95—100	97½—99
647,740	,,	May 18	5	5%	Southampton Ord.	99—102	77—82	...
121,275	,,	June 29	4	4%	Do. 4 p.c. Deb. Stk.	..	63—68	...
120,000	,,	July 27	—	7½%	Tottenham { A 5 p.c.	135—138	112—117	...
782,275	,,	,,	6	6%	Tottenham { B 3½ p.c.	115—117	98—103	100½—101
181,255	,,	June 15	4	4%	District { 4 p.c. Deb.	87—89	75—80	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	⅛—⅜	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	20—30	...
236,476	Stk.	Aug. 24	5	2½%	Tynemouth 5 p.c. max.	108½—109	75—77	...
30,000	,,	July 27	8½	72/6	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	111—115	...
855,636	,,	,,	6½	57/6	Do. B 3½ p.c.	129—134	95—100	99½—100
128,075	,,	,,	—	50/9	Do. C.	..	87—92	90—90½
140,865	,,	,,	—	50/9	New Ordinary	..	87—92	90—90½
352,000	,,	,,	6½	53/9	Wimbledon 5 p.c.	117—122	95—100	...
98,000	,,	,,	6½	58/9	Epsom 5 p.c.	121—126	95—100	...
83,416	,,	June 29	3	3%	3 p.c Deb. Stk.	66—69	57—60	...

* Ex Div.

STOCK ISSUE.

By Order of the Directors.

NEW ISSUE OF ORDINARY AND DEBENTURE CAPITAL.

THE WELWYN, KNEBWORTH, AND DISTRICT GAS COMPANY, LTD.

MESSRS. A. & W. RICHARDS are Instructed to offer

FOR SALE BY TENDER

400 £10 NEW ORDINARY SHARES

(Ranking for a maximum Dividend of 10 per cent. equally with the existing Original Shares receiving that rate).

MINIMUM PRICE OF ISSUE, £12 10s. per Share. Yielding 8 per cent.

Also

£1000 SIX PER CENT. REDEEMABLE MORTGAGE DEBENTURES.

To be Redeemed at par on the 31st of December, 1932.

MINIMUM PRICE OF ISSUE, PAR.

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HERBERT H. HUMPHRIES, M.Inst.C.E.,
City Engineer and Surveyor.

The Council House, Birmingham,
Oct. 27, 1922.

Continued on p. 324.